

Kind Friends!

The publishers and editors take this opportunity to thank friends and subscribers whose generous assistance has made the reviews in this issue possible; and to wish all a happy and prosperous New Year

All Production Records for Cement and Aggregates Broken in 1927

Keen Competition in Price, Quality and Customer Service

ALL previous production records for sand, gravel, crushed stone and portland cement were exceeded in 1927. It looks now as if the crushed stone industry headed the procession with a little better than 6% increase over 1926 figures; sand and gravel was perhaps a trifle behind, with a little less than 6% increase; portland cement production was about 5½% better in 1927 than in 1926. These records reflect a year of great construction activity in highways, municipal improvements and engineering work generally; and there is about the same outlook for 1928. Apparently crushed stone fared better than cement and sand and gravel because of a large tonnage that went into the surfacing of secondary roads with light coatings of stone, usually treated with asphalt or tar. Our records show that approximately half the tonnage of crushed stone this year went into highways, which is a larger proportion than formerly. The only branch of the crushed stone industry to register a loss was iron and steel furnace flux.

The prices of all building materials slumped in 1927. Generally speaking portland cement and aggregates were no exceptions, although there were fortunate localities that were immune from this price-cutting. However, both where prices were firm, and where they were cut, the demand from large users, such as state highway departments, was for better material—more costly material to make—so that the sum total was considerably less profit than the industry, as a whole, feels entitled to.

The slackening in building of the ordinary dwelling and commercial type, pronounced in the last half of the year, probably accounts for a loss of about 10% in the production of lime, as compared with 1926. In the case

of gypsum products much energy and sales effort on new products, and the additional requirements for the increased production of portland cement, probably caused an increase of about 2% in production over 1926. On the other hand prices have fallen off from 5 to 10%, so that the total value of gypsum products produced will show a loss compared with 1926.

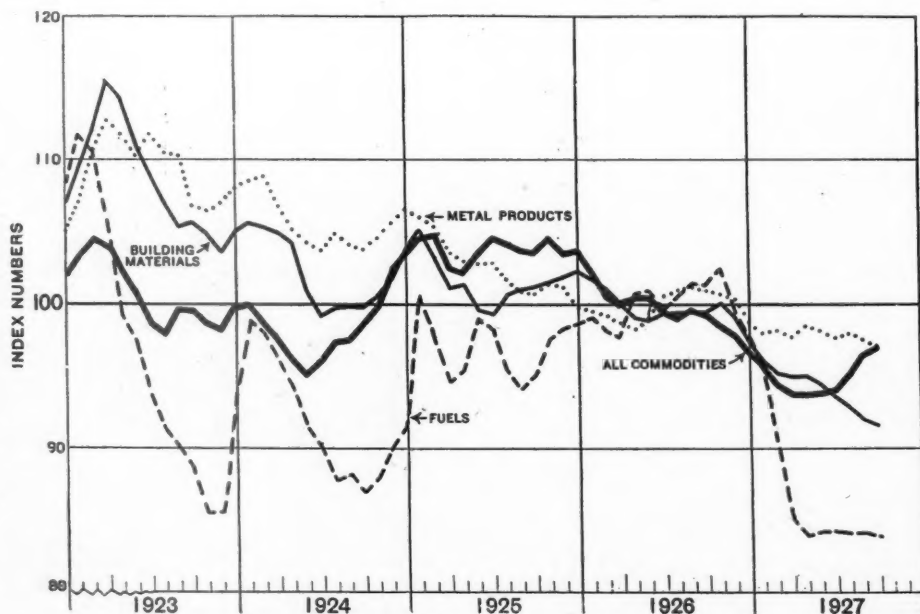
The lime and silica industries are the first in the rock products industry to experience the crises that have already overtaken the textile, the coal, the fertilizer, the petroleum and possibly other industries. Over-capacity and a pronounced drop in demand have led in both cases to a resort to "the old army game" of dog eat dog.

The problem of all these industries is receiving the attention of economists and bankers with the hope of finding a less harsh solution than that inflexible law of nature, the survival of the fittest. In such trade crises brains generally count for as much as equipment, that is, an old, somewhat antiquated plant with more than average efficiency or skill in management, and firmly entrenched in the trade, stands quite as good a chance to survive as some of the newer ones with less skillful management.

Optimism and unbounded faith in the future development of the country invariably lead to periodic over-

capacity in one industry after another. With the possible exception of the steel industry (in more recent years) these situations have ever been met by the squeezing out process (every man for himself, the devil take the hindmost!), as a necessary economic measure.

After several years of active and successful developments of trade associa-



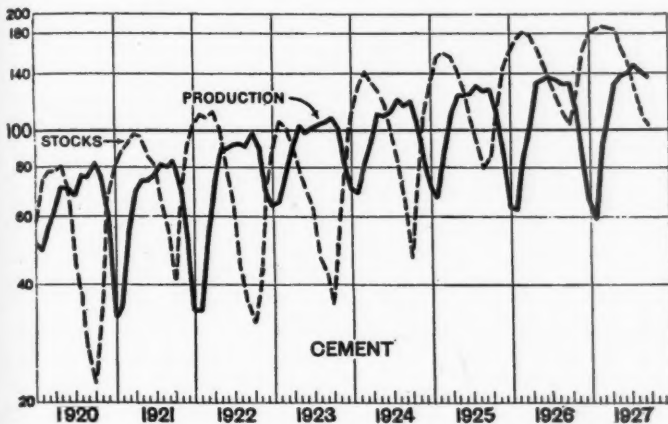
The course of the price index number in basic industries compared by the Bureau of Foreign and Domestic Commerce, U. S. Department of Commerce, (monthly average of) 1926 prices as a basis (100)

tions, specially intended in most cases to handle just such crises, many leading thinkers in industry are reluctant to resort to the harsh measures of open, trade warfare for the elimination of the weak sister. One suggestion, being made now for the coal and the petroleum industries, is the appointment of a "czar" or dictator, to control production. Aside from the question of legality this after all is an un-American method of solving problems—if it does solve them.

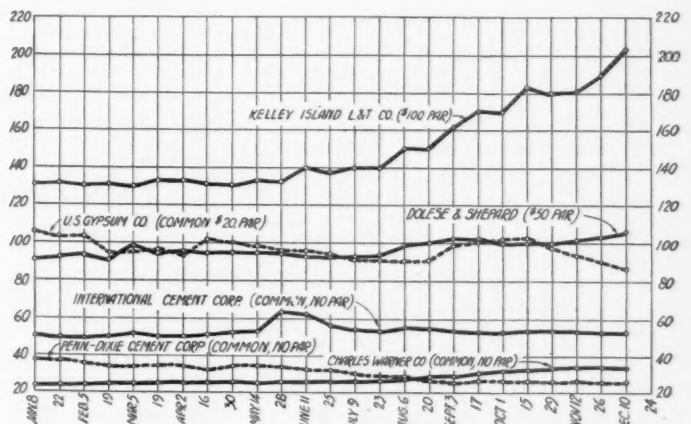
This country has met many national crises without resort to autocratic government. Its business men

cient character to have and to merit the confidence of all his business associates; then through such trade associations as now exist in all the rock products industry, by persuasion, education, and if necessary discipline, at least a working majority of any industry can observe business tactics that will reflect honor and a decent share of prosperity on all the industry.

This may look like a pessimist point of view, but it is not; to be forewarned is to be forearmed. The predicament of the lime industry is directly traceable to the indifference of many operators, some large ones,



Vital statistics of the portland cement industry plotted by the Bureau of Foreign and Domestic Commerce, U. S. Department of Commerce; monthly average 1923-1925 taken as 100

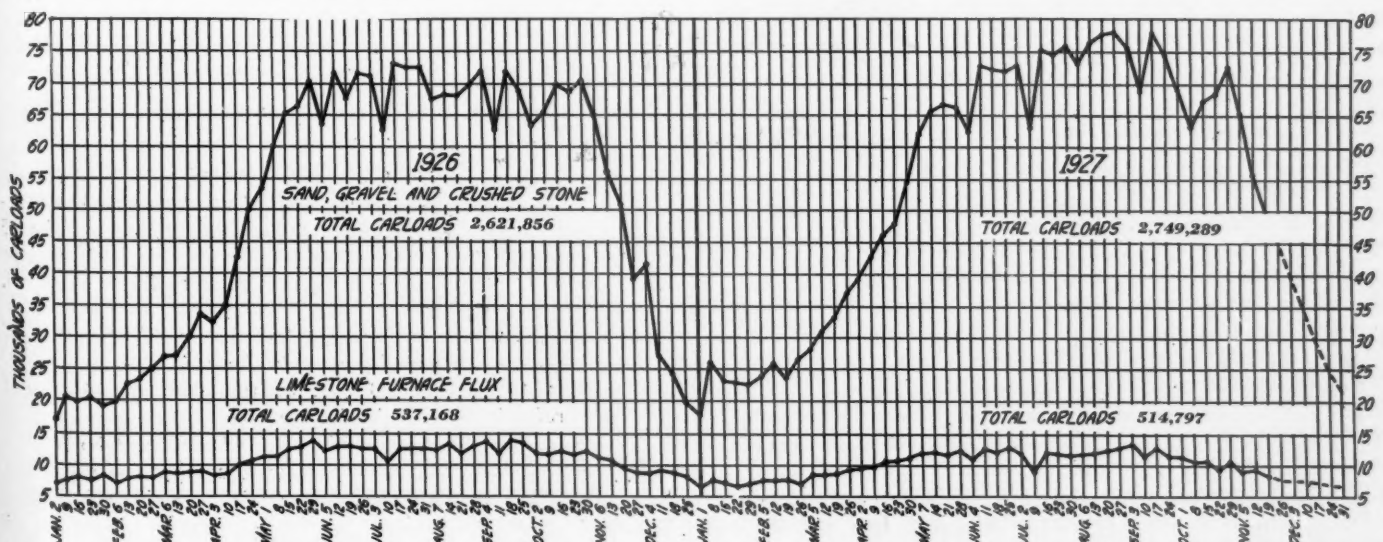


Monthly variation in the stock quotations of some typical large rock product enterprises during 1927 (plotted by Rock Products)

ought to be able to meet commercial, or business, crises without resort to autocratic measures. The method of the steel industry under Judge Gary's administration of the United States Steel Corp., is more in line with American principles and ideals. He exerted a tremendous influence, but he did it by force of intellect and probity of character. With him as mentor and advisor the well-organized steel industry was able to steer a course that was fairly profitable to all.

Every industry that would avoid ruthless warfare must develop or find its Judge Gary—a man of suffi-

but mostly small ones, and their failure to visualize the approaching crisis, and to meet it squarely and openly. We believe the portland cement industry is meeting the issue and will continue to do so with intelligence and foresight. We know that in the sand and gravel industry broad-minded, clear-thinking leaders have done much in local situations to discourage "overplanting" in particular localities. It is presumed all business men, who have been able to achieve executive positions, have sufficient intelligence to be tractable if some few unselfish leaders show the way.



Car loadings of stone, sand and gravel, and furnace flux stone (below) based on the statistics of the Car Service Bureau of the American Railway Association, for the years 1926 and 1927

The Problems of the Portland Cement Industry in the United States

Extracts from the Presidential Address at Twenty-fifth Anniversary Meeting of the Portland Cement Association

By G. S. Brown

President, Portland Cement Association
President, Alpha Portland Cement Co., Easton, Penn.

THE PERIOD of heavy shipments for the year 1927 in the cement industry is at an end and once more we shall see a new record in the consumption of portland cement set up. The Bureau of Mines has recently developed a conservative measure of capacity to produce in this industry, which indicates that, despite the increase in consumption from year to year, about one-quarter of our total capacity will have been idle during 1927—the year of largest consumption ever known. In other words, we could have produced, had there been a demand for the product, one-third more cement than will be shipped this year.

The margin between cost and net realized has continually narrowed during the year in most sections of the country, due, in part, to importation of foreign cement, which, while of less volume than in 1926, is still a very real menace on all of our sea-boards; in part to increase in cost because of higher quality, and, in part to the increase in cost due to greater sales expense, since we are all trying to get the maximum share of consumption possible. Therefore, while our volume is relatively good, the financial situation is likely to be in many instances quite unsatisfactory to shareholders.

However, this industry is not alone in this condition. Many other industries find themselves with great excess capacity and dwindling profits. Indeed, this condition is so general that a United States senator has dubbed it "the era of profitless prosperity."

Some Previous History

Some of us can remember the period from 1908 to 1915, inclusive, when also there was overproduction as well as lower prices. I know of one company, which in one of those years showed a profit for the year, which was almost entirely made up by the difference between the cost of new bags purchased and the price received for them from its customers. In addition, no depreciation was charged for that year.

In the "History of the Portland Cement Industry in the United States," Mr. Lesley makes the statement that during the period 1908 to 1911, inclusive, 32 cement manufacturing companies were taken over by their creditors. I am told that not more than half

of the mills of Kansas weathered that period and that many in Michigan also expired. . . . All of this may sound pessimistic, but it is not so intended. It is an attempt to look the facts squarely in the face in order to see whether we cannot find ways to better conditions.

Consumption Stabilized

I am coming to the conclusion that we may consider cement consumption fairly



G. S. Brown

well stabilized at or about the present figures; that the country will normally use about the quantity taken in the last year or two, and, if there is material change, it will be upward.

There is, however, one danger to be guarded against. We must be careful lest in our effort to furnish a product, which will meet the special requirements of various individuals throughout the country, we do not so increase our cost as to cut down its use. We are producing today a building material with a wider range of usefulness

than any other. It is subject to more abuse than any other. . . . That is not impossible to damage, perhaps irretrievably, a great industry by increasing cost to the point where substitutes will take the market is shown by the condition in which the anthracite coal industry finds itself at the present time.

Old-Time Cement Was Satisfactory

Concrete roads built in 1909-12 in Wayne County, Mich., are still in use, although widened by concrete slabs on either side. Fifteen years ago a mile of concrete was built in New Jersey by the cement mills of that state, and it is still in use and now concrete extends from either end to Phillipsburg and Washington respectively. Twelve years ago a concrete road was built between Easton and Bethlehem, and except for the joints maintenance has been practically nothing if the sides of the road are not considered. Thirty years ago the Holyoke dam was built of domestic cement and it still serves its purpose. I, personally, know of many structures built of cement 10, 15, 20 and 25 years ago, which are as good today as when built.

I may be forgiven if I do not enthuse when I hear criticism of the quality of our product. I hope to see the quality of cement improved, but not to the extent that the public is deprived of so cheap and useful a building material as it has had in the past and we manufacturers surrender a portion of our market to substitute materials.

Grow and Progress

I had thought when first considering the matter that a large part of this address might be devoted to a review of the progress of the cement industry during the 25 years our association has been in existence. Those years hold material for a talk much longer than this one.

We might congratulate ourselves on our quantity growth—from 17,000,000 to 170,000,000 bbl., or ten-fold; on our quality growth—from no specification and a quality depending on the judgment and honesty of the manufacturer to specification quality by all makers as a minimum—from a product looked on with suspicion to one accepted from all plants by users with confidence; on labor used, cut in two or better; on acci-

dent prevention—from perhaps the worst record in industry to nearly, if not quite, the best; on the use of fuel, a reduction of 40 to 50%; on distribution, instead of passing our product through four or five hands before it reaches the consumer, we now have but one intermediary. And as a result of all this, despite the fact that wages are four times as great as in 1902; that coal is two or three times as expensive; that materials are many times costlier; that quality is uniform and materially higher, those who use our product pay but little more generally and in some cases less for it than in 1902.

Present Problems

We pride ourselves on the fact that we early saw the necessity of co-operation and that we were among the first to recognize the economy to ourselves and the value to the public of joint effort in many of our activities. As I see it, co-operative effort must be enlarged, not decreased. On every hand we see evidence of the so-called new competition. Surely it will not be long until our lawmakers will loose the fetters that force us to fight among ourselves, while foreigners take from us the markets we have built up along the seaboard, and materials which may be substituted for ours take for themselves in every part of our country business which we have developed and of which we are but now hoping to reap the benefits. Far from accepting the fact that concrete streets and highways are the best as well as the cheapest permanent surface, our competitors see our successes and say, "Let us go and do likewise."

Overproduction

What about overproduction? The latest government figures indicate a capacity in this country of about 230,000,000 barrels annually, and that about three-quarters of this capacity will be used this year. We have a capacity $33\frac{1}{3}\%$ greater than our consumption. Most of this is modern. There are some plants that have not been kept up to date, but they represent only a small percent of the total, and, under present conditions, are probably operating at a loss or at best breaking even. I am confident that if we maintain our front, we shall not see the consumption of cement reduced in my lifetime. Indeed, we are reasonably sure of a small increase from year to year, due to the natural increase in our population. Such increase, however, will come far short of taking up the large over-capacity.

Individual effort cannot produce increased use of our product except at prohibitive cost, but co-operative effort will give us what we must have at a reasonable cost. We must not decrease association effort, but must enlarge it.

Where may we hope to place this surplus capacity? Large as is our road construction program, it comes short of meeting the demands of the public. Of all the taxes paid by it, the public gives up for roads with comparative enthusiasm. A part of it at

least realizes that good roads pay back principal and interest of cost very quickly. We have evidence that road building is far behind the demand in many places, and if we work hard, we may continue to increase the use of cement in this great field. Ed. N. Hines, the father of concrete roads, long since has been obliged to widen and widen the roads he originally built. Few of the highways which have been made permanent will carry the traffic comfortably within a year of their construction.

The Field of Municipal Improvement

What a waste there is in moving about in our great cities—heavy traffic mixed with light and each held back by the other; trucks loading and unloading in continuous lines for block after block, with consequent congestion of traffic. There is but one answer and that is separation of heavy traffic from light. We shall see double-decked streets, such as Wacker Drive in Chicago, with the upper deck for light traffic and shops and the present pavement for the use of trucks and stores handling heavy material. To me it seems that when this happens those along such streets will get larger returns from their property, and trucks and taxicab owners will double their earnings, or cut their charges in half. If I am right, such construction once started cannot be stopped and should provide further outlet for surplus production.

Grade-Crossing Elimination

We open our paper each morning and read of scores of grade-crossing accidents, with consequent death and dismemberment of our citizens. How long will we sit quietly by and see our citizens killed at a rate almost as great as the death rate of our soldiers in France without protest. Separation of grade crossings, both railroad and highway, is bound to proceed at an increasing rate. From my point of view the greatest good to the public would be served if Congress, instead of recapturing excess earnings of the railroads, would direct that such excess should be applied to separation projects in excess of those which normally would be made by them. At any rate, there is another increasing use for cement.

For Fireproof Buildings

Our attention is being drawn continually to the great fire waste in this country. The figures given by the government and the National Fire Protection Association are astounding. We have done something to reduce this waste in our campaign for fire safe schools and other buildings, where crowds are likely to collect. If we could persuade, as a starter, builders to make the first floor of all structures of cement, we might call ourselves public benefactors despite of the fact that we would reduce surplus production of our product thereby.

Highway Bridges and Tunnels

We are familiar with the highway bridge across the Delaware River between Phila-

delphia and Camden. It was thought that such a bridge could be built only by the use of public credit, and, so far as Pennsylvania was concerned, it was intended that the bridge should be free. New Jersey, however, insisted upon making it a toll bridge until the bonds issued to build it had been retired. The money collected from those who travel over this bridge is far exceeding anything that was anticipated. While the thought of a toll bridge or a toll road is more or less repugnant to American public opinion, the success of this method, it seems to me, will open the way for other similar structures in territory where these conveniences are greatly needed, but the authorities cannot see their way clear to tax the people for them. If the collections from tolls in the New York-Jersey City vehicular tunnel, after it is opened, are as much greater than anticipated as were the collections from the Delaware Bridge, I can foresee a considerable increase in structures paid for by tolls, not only bridges, but high speed highways, between large centers of population, such as New York and Philadelphia, Detroit and Chicago, and between other centers of population which will readily come to mind.

Must Strive for Cost Cuts in Distribution

I have already said that the price of our product continues low and the margin between over all cost and net received does not increase. Indeed, in many cases this margin has decreased so that the capital return is seriously in danger. Our mills have been modernized. They are efficiently operated and in only one department of our business may we consider ourselves seriously inefficient, that is in marketing our product. The elimination of waste through co-operative action and effort, whether in manufacturing or selling, is one which undoubtedly has the whole-hearted approval of our government, and it may well be that, if we, as an association, devote the same intelligent effort to increase efficiency in this department of our business, as we have done in conserving the use of labor and in decreasing the number of accidents, we shall be successful to the same degree.

An Individualistic Industry

Our industry is said to be the most individualistic of the major industries in this country. In an industry so organized, the judgment of the individual may be swayed through personal antagonisms and thereby precipitate disastrous price wars. In my judgment the day, when the individual can follow his own sweet will without loss to himself, to his industry and to the public, has gone. Menaced from without our borders by foreign competition; menaced from within our borders by the competition of materials which may be substituted for our product; menaced with the depressing effect of large overproduction, as we are, our salvation can only come through presenting a solid front to those interests which would take from us that for which we have labored.

Portland Cement Industry in 1927

By Robert W. Lesley

Honorary Member, American Society for Testing Materials

IN ROCK PRODUCTS' 1926 review number, predictions were ventured on the outcome of the year 1927. The year has now closed, and while the official figures are not yet in hand, it is expected that the final results will show shipments of about 170,000,000 bbl., as against 161,781,000 bbl. in 1926. The gain of 1926 over 1925 was estimated at about 3%, while the estimated gain this year shows slightly over 5%.

If the industry for its success or failure during the business year relied solely upon the gain in shipments, 1927 would have been a very successful year. Unfortunately, however, conditions arose during the period which caused great disappointment in the minds of the trade, by reason of the decreased earnings of many of the companies. The fact predicated in last year's article as to an excess of capacity has been more than verified. The government figures indicate a capacity at the end of the year of about 230,000,000 bbl. annually, against estimated shipments in 1927 of 170,000,000 bbl.; and more mills are under construction, which will probably toward the middle of the year increase the 1928 capacity by some five or six million barrels.

Seaboard Markets Hit by Foreign Cement Imports

But this has not been the only factor to contend with, because foreign imports have not ceased to come in, though in smaller quantities than during the year 1926. While in 1925 and 1926 the new construction in Florida took up a great deal of this imported cement, the present imports are coming to seaboard cities such as Boston, Providence, Philadelphia, Baltimore, Wilmington, N. C., Charleston and other points on the Atlantic coast, as well as Seattle, San Francisco, Los Angeles, and other points on the Pacific coast. The effect of this distribution of foreign material over so large an area has, by reason of the low prices made, largely reduced the selling price of the American product at the seaboard points, and also at intermediate points between mills and seaboard, covering large inland areas of the country. Mill earnings thus suffered in no small degree during the year.

Prior to the passage of the Underwood bill and its successor, the Fordney tariff, there was for many years a duty of about 20 cents a barrel on portland cement, which commodity is now on the free list. When it is considered that American labor employed in cement manufacturing earns on an average of \$4.50 per day, against 90 cents a day in Belgium, whence most of the im-

ports come, it is easy to see the injury done to American labor in taking off the tariff. This injury extends not only to the labor actually in the cement mills themselves but to the labor in the coal industry, the cotton duck industry and the machinery industry, all of which important industries furnish material used in the cement industry.



Robert W. Lesley

Percentage Increases Since 1921

The following figures show the percentage of change in quantity of shipments of portland cement:

1922 over 1921.....	23+%
1923 over 1922.....	15+%
1924 over 1923.....	7+%
1925 over 1924.....	7+%
1926 over 1925.....	3+%
1927 over 1926 (estimated)....	5+%

The year's percentage of gain in cement consumption is considerably higher than the increase in the annual growth of population in the United States of 1½% and is an indication of the activity of the cement industry in developing new markets and new uses in excess of those which normally exist.

Building as a whole shows an increase,

but there is a falling off in the building of homes and an increase in public works such as roads, sewers, bridges, sewage disposal plants, reservoirs, etc. The largest increase is in roads, concrete roads up to December 1 showing contracts let for 124,008,764 sq. yd. in 1927, against 108,851,541 sq. yd. in 1926, an increase of 15,117,223 sq. yd. This condition has existed in the building industry before, and in a way marks the end of a cycle of good times. After manufacturing and railroads have made their construction and employment is general, with good wages, home building follows; and then when general business slackens, money is plentiful. It is at this period of the cycle when bonds of municipalities, boroughs, counties and states are easily floated at low interest that the great development of public work of all kinds goes on, for the dual purpose of economical financing in a time of easy money and the giving of employment to men in dull business periods.

From figures at hand, the indications are that building, especially large public works, will continue actively during 1928 and that the cement industry will benefit accordingly, unless there is some unforeseen slump caused by the presidential campaign or other unanticipated conditions.

While the revival of the old natural cements in improved form under various trade names has been going on and the material has been largely used for bricklaying and other purposes where smooth, fat mortars are needed, it must not be lost sight of that this has been and will continue to be a factor that may reduce from time to time the consumption of portland cement in the special field named.

Rapid-Hardening Cements

The development within the past few years of rapid-hardening cements is another element to be considered. These may be divided in a general way into two classes, the alumina cements which are made of mixtures of bauxite (alumina) and lime, and the "super cements" which are made of practically the same materials as the recognized, normal portland cement but contain a slightly higher lime content and are burnt at higher temperatures and are more finely ground, both in the raw and in the finished state. Other "super cements" are of a class to give waterproof qualities and great denseness; and while these new products are finding a market, as a rule they are sold at prices considerably higher than the regular portland cement, though meeting the standard specifications and having the additional

quality of quick hardening. In connection with these cements, Hendricks and Ringade, French scientists, have been recently writing on the subject and going so far as to recommend specially selected coal of high grade for their manufacture.

Increased Use of Large Units

From the intermittent vertical kilns first used in the American portland cement industry, with their capacity of 150 to 200 bbl. a week, it was a far cry to the first 60-ft. rotary kilns producing about the same quantity in a day. When Edison some 20 years ago patented his 150-ft. kiln, the invention was considered impossible and ridiculous. What a change it is, therefore, in the industry to see the adoption in many of the plants of kilns running all the way from 200 to 343 ft. in length, with capacity from 1200 all the way up to 1800 bbl. a day for a single kiln. This change, together with the introduction of grinding machinery almost as large as some of the early rotary kilns, has had a tendency to reduce labor cost per barrel. These improvements, with better protection of moving parts of machinery, conveyors and elevators, have, together with the use of electricity as a motive power, reduced the accident hazard.

Truck Delivery Successful in Great Lakes District

The use of trucks for delivering cement from mill to consumer has proven successful in many cases, especially around the Great Lakes, and has increased the tendency of cement plants to locate in or within short hauling distances of large cities. Other manufacturers on the Lakes are entering into competition in this same field by transporting the manufactured cement directly to silos in the large lakeside cities, whence it can be delivered by truck to the consumer. The theory upon which this practice is based is that the manufacturer in some of the lake cities has to bring his limestone a distance of many hundreds of miles to his mill and pay freight, handling and storage on the limestone, with its high content of carbonic acid gas; while the manufacturer shipping the finished cement and using his own lake transportation and having well located silos can, by reduction in weight, bulk and storage, more than meet the competition of the local manufacturer.

A Leader in the New Competition

While competition of company with company, of mill with mill and of individual

with individual has marked the history of the portland cement industry, it must be recognized that it has for many years been a pioneer in the more modern form of competition of industry against industry. The Portland Cement Association from its earliest days sought new uses for the material. Representing at its inception in 1902 an engineering and building material that was but little known in the United States, it has gone on progressively to find new outlets for portland cement. By publicity, by scientific research and by the development of cement engineering offices it has been constantly in the foreground and finding new outlets. It is to this activity that cement manufacturers are as a whole giving every assistance and it is this that is keeping up the consumption of cement beyond the normal growth of population. It is by substituting portland cement in its various form for materials of other industries that the product is finding its wide field.

It is to the Portland Cement Association, with its continued and persistent efforts, that the industry owes its thanks for the new markets constantly being developed and for its success in the field of competitive industrialism.

Fourteen New Cement Plants Added to the Fold in 1927

Largest Output in History but an Increase in Productive Capacity Far in Excess of Increase in Shipments

THE YEAR 1927 will probably go down in portland cement history of the United States as the most active in cement plant building of any year up to this time. Fourteen new plants added a producing capacity of 13,700,000 bbl. per year. Additions and improvements at older plants increased the industry's annual capacity by at least 4,000,000 to 5,000,000 bbl.; so that we are conservative in saying that the year's developments added 20,000,000 bbl. in plant capacity, or more than twice the increase in consumption during the same period.

Production of portland cement for the year 1927, based on the compilations of the U. S. Bureau of Mines, to and including November, and our own estimate for December, was approximately 170,911,000 bbl.; shipments were approximately 171,705,000 bbl.; in 1926 production was 164,530,170 bbl. and shipments 162,187,090 bbl. The increase in production was therefore 6,381,000 bbl.; the increase in shipments 9,518,000 bbl. In percentages the increase in production was approximately 4%, and the increase in shipments, approximately 6%.

The average net plant price was un-

doubtedly the lowest it has been in several years—our estimate is \$1.65 per bbl., based on reported reductions ranging from 50c in North Carolina to practically nothing at some fortunate points. This is 6c per bbl. lower than the average net price of \$1.71 in 1926 (based on the total value of the 162,187,090 bbl.). Price reductions have been most radical on the Eastern seaboard and were caused primarily by an attempt to meet the competition of imported Belgian cement; but many inland points have been affected by these reductions, or by the pressure of competition from new plants. The value, then, of the 1927 production is probably about \$284,000,000, against \$278,000,000 in 1926.

The Bureau of Mines lists 140 active plants at the end of 1926; therefore, there were 154 at the end of 1927. This is not the total number of mills, however, because where two or more mills form a single group, as for example the three mills of the Universal Portland Cement Co., at Buffington, Ind., they are classed in the government reports as one plant. According to our count there are actually 168 active mills in the

United States at the end of the year 1927.

PRODUCTION AND SHIPMENTS, BY DISTRICTS, IN 1926 AND 1927 FOR FIRST ELEVEN MONTHS, JANUARY TO NOVEMBER, INCLUSIVE, IN THOUSANDS OF BARRELS

Com'l district	Production		Shipments	
	1926	1927	1926	1927
E. Pa., N. J., Md.	38,772	39,158	38,598	39,507
New York	8,167	9,883	8,310	10,078
O., W. Pa., W. Va.	15,050	16,308	15,218	16,727
Michigan	11,279	13,007	11,631	13,395
Wis., Ill., Ind., Ky.	19,828	20,304	21,244	21,826
Va., Tenn., Ala., Ga., Fla. & La.	14,286	14,847	14,011	14,742
E. Mo., Minn., S.D.	13,234	13,074	13,742	14,324
W. Mo., Neb., Kan. and Okla.	9,661	9,384	9,783	9,896
Texas	4,622	5,142	4,726	5,334
Colo., Mont., Utah	2,427	2,020	2,388	2,199
California	12,916	13,213	12,718	13,055
Ore. & Wash.	3,071	3,320	2,980	3,475
Totals	153,313	159,660	155,349	164,558

Present and Prospective Capacity

Estimates of total plant capacity vary somewhat, because, we presume, rated and actual capacities of kilns of various sizes are not always the same, and possibly some estimates are based on 300-day operation and others on 330-or-more-day operation per year. The U. S. Bureau of Mines' estimate of the capacity of the 140 plants at the end of 1926 was 204,400,000 bbl. On

this basis a fair estimate of the present capacity of the industry is 225,000,000 bbl. a year, or 53,000,000 bbl. in excess of the 1927 demand—or a little less than 31% above 1927 demand.

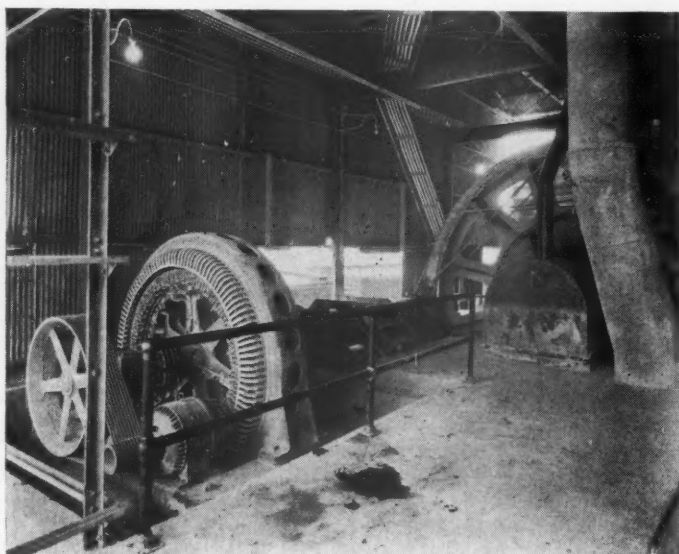
This would not be serious, perhaps, if there was a prospect of a halt in new plant building, and of plant additions, to give the industry time to take up some of this slack. The fact is, however, that our records show there are eleven more new plants actually

the year are listed below, based on published news items during the year, verified where possible, by correspondence, and based on other sources of information. The list is not given as complete, except for new plants. Doubtless there were many more plant additions and improvements than those noted, but these may be taken as typical of the struggle of practically all producers to keep abreast of the newer plants, and to utilize new technical developments.

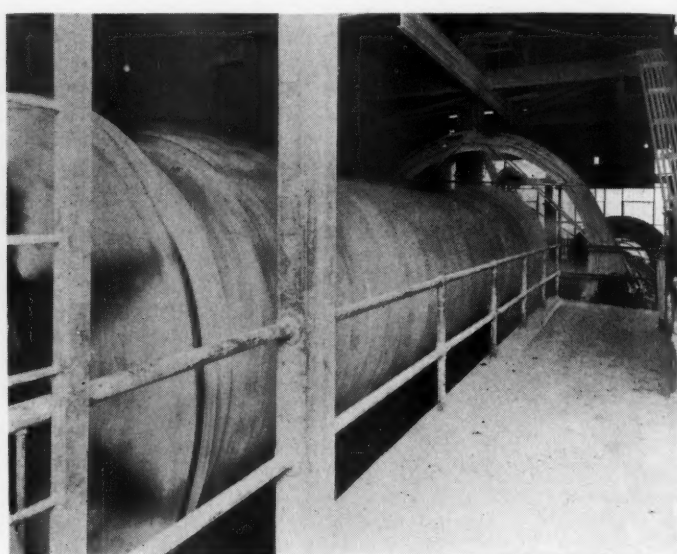
plant. (Capacity 1,100,000 bbl. per annum.)

Coplay. New silos and packhouse completed; first Solo mills of the Polysius Corporation installed in America; clinker storage and crane added; all electrical equipment changed from 25 to 60 cycle (see *Rock Products*, May 28, 1927)—a good example of modernizing one of the oldest mills in the Lehigh Valley.

Cumberland. A newcomer; Cumberland Portland Cement Co., Cowan, Tenn., began



One of the latest developments in big compartment-mill drives—Kosmos Portland Cement Co.



Same mill from the other end—an example of recent installations at older plants—Kosmos

under construction, which will go into production in 1928, with a total contribution of approximately 8,750,000 bbl. Contemplated additions to existing plants, or additions actually in the course of construction will add at least another 2,500,000 bbl.—or there is the almost certain prospect of a plant capacity by the end of 1928 of 235,000,000 bbl., and a prospective demand of perhaps 175,000,000 bbl., if we are optimistic.

We have records, or notices, of some 20 more projects in various stages of promotion, three of which show sufficient signs of life to be possible of materialization in 1928. One of these is practically certain to go through. It should be obvious, therefore, to anyone who reads these lines and glances at these statistics that there is little or no justification for new portland cement plants unless they are specifically intended to take away the business of existing plants. This may be considered possible by more strategic locations of new plants, or be based on the theory that some of the older plants are too inefficient to keep in the running. Neither of these premises can be unqualifiedly accepted, as what follows, should tend to prove. In any event the industry is headed for uneconomic duplication of manufacturing, sales and distribution efforts in many localities.

Significant Developments

Some of the important developments of

Alabama (subsidiary of the International). The dry-process plant at Birmingham, Ala., was converted to wet process; other improvements and additions were made, including lengthening the kilns to 280 ft., increasing the capacity of the plant by approximately 600,000 bbl. per year.

Alpha. Reported to have made improvements at its Continental, Mo., plant.

Atlas. New mill equipment at Northampton, Penn., plant.

Ash Grove. Began the manufacture of a new early high strength cement known as "Quickard," at Chanute, Kan., plant.

Basic. A newcomer; began producing in May; Basic Products Co., Kenova, W. Va.; annual capacity 600,000 bbl., wet process.

Beaver. Kiln lengthened and grinding equipment added, increasing capacity 25% (100,000 bbl.).

Bessemer. Began manufacture of "Super Cement" at Walford, Penn., plant.

California. Bought extensive limestone deposits near Eden Hot Springs, Riverside county.

Colorado. Fort Collins, Colo., new dry-process plant went into production in December. This plant is reputed to be the last word in dry-process, waste-heat plants. The kilns are 11x175 ft. A system of mixing and blending the raw materials using the Fuller-Kinyon pneumatic conveying system, automatically controlled, is a feature of the

production in May; both white and gray cements; first installation of an Allis-Chalmers' Newhouse crusher for secondary reduction ahead of compeb mills; wet-process 10x150-ft. kilns; 7x26 ft. compeb mills (described in *Rock Products* May 14, 1927). Capacity, 800,000 bbl.

Dewey. New plant at Buffalo (Davenport), Iowa, went into production in July. Raw materials practically a natural cement rock. Edge Moor waste-heat boiler power. Kilns are 11x175 ft. (wet-process); mills 7x26 ft. compebs. Capacity 1,000,000 bbl. (described in *Rock Products*, September 17).

Federal. A newcomer; Federal Portland Cement Co., Buffalo, N. Y.; plant went into production in July. Slag and limestone are the raw materials; the second plant in the United States using slag as a raw material in wet-process; the first portland cement plant in the world designed to include slurry filters (United Filters Corp.). Kilns are 11x175 ft.; compeb mills 7x26 ft., capacity 1,200,000 bbl.

Florida. A newcomer; Florida Portland Cement Co., Tampa, Fla.; plant went into production in October. Notable for construction difficulties. Raw materials are lime and "lime clay"; quarry is 50 miles distant from plant; kilns (wet-process) 11x175 ft.; compeb mills 8x7x27 ft. (raw) and 7x8x26 ft. (finish). First important installation of Dust Recovery, Inc., mechanical dust col-

lectors for stack dust. Capacity 1,500,000 bbl. (described in *ROCK PRODUCTS*, November 26).

Great Lakes. A newcomer, the Great Lakes Portland Cement Co., Buffalo, N. Y., began production in July; largest plant constructed in several years (four 11x250-ft. kilns); limestone, from Michigan, and shale are the raw materials; mills are 8x30 ft.; one of the finest equipped plants in the world. Capacity 2,300,000 bbl. (described in *ROCK PRODUCTS*, September 3).

Hawkeye. New waste-heat power plant completed (three Edge Moor boilers of 800 hp. each); new electrical equipment.

Huron. New lake cement carrier launched (7500-ton cargo); and a 200,000-bbl. silo storage and pack-house at Buffalo is under construction.

Indiana (subsidiary of the International). Completed changes and improvements and began the manufacture of a new quick-hardening cement known as "Incor."

International. Established a research laboratory at New York City for work on cement and concrete in charge of Duff A. Abrams.

International (Portland Cement Co.). Electrification of plant at Powell, Wash., and other changes and improvements are under way.

Kosmos. Extensive changes and improvements in grinding equipment including installation of an 8x35-ft. compeb mill driven by a new type "Hytork" synchronous motor (Allis-Chalmers).

Laurence. New dust-collecting installation at Siegfried, Penn., plant. Began production of "Super Cement."

Lehigh. Many changes and improvements made at various mills, including conversion of Mason City, Iowa, plant from dry to wet process and the modernizing of the Union Bridge, Md. (old Tidewater) plant. A fine research laboratory for work on concrete and cement has been established at Ormrod, Penn.

Louisiana (subsidiary of the International Cement Corp.)—A newcomer, the Louisiana Portland Cement Co., New Orleans, La., began production in June, 1927, using oyster shells and material dredged from harbor as raw materials; subsequently developed limestone quarry at St. Stephens, Ala. Notable for difficult construction problems. Kilns are 10x220 ft. (wet process). Capacity 800,000 bbl.

Louisville. Changes and additions begun in 1926 in crushing and coal-grinding departments completed. A mechanical dust recovery system (Dust Recovery, Inc.) installed to collect stack dust.

Manitowoc. Installing slurry filters (Filtration Engineers, Inc.) and Hercules mills ahead of compeb mills.

Marquette. Installing new kiln and additional mill equipment at La Salle, Ill., plant, increasing capacity 500,000 bbl.; installation

includes a 989-hp. Edge Moor waste-heat boiler and accessories; at Cape Girardeau, Mo., plant, is erecting 16 new silos to hold 165,000 bbl. Began manufacture of "Super Cement" at La Salle.

National. Completed 14 reinforced concrete silos and the installation of additional mill equipment, increasing capacity probably 300,000 bbl.

Nazareth. Plant completely modernized, with individual motor drives and speed reducers. Following is a resumé of the major changes: (1) Complete rebuilding of the entire raw tube mill department. A new steel building was erected over the old frame building, and latter then removed. New steel tube mill bins were included, as were seven tube mill feeders with individual variable speed motor drive. (2) A new crushing plant is rapidly nearing completion. This building is of concrete and steel and is located in the quarry. In it are installed a 350-hp. Flory hoist; a 36x60-in. Allis-Chalmers roll crusher, driven by a 200-hp. motor; an SXT-13 Pennsylvania hammer mill, driven by a 400-hp. motor. In the same building is a modern wash or change room for the use of all quarry employees. (3) A new gypsum storage built of concrete and steel was erected. This storage has a capacity of approximately 1800 tons of gypsum. (4) A concrete oil house was completed. This building is equipped with Bowser oil tanks and the latest type De Laval oil purifier. (5) The change-over of the entire electrical equipment from 25- to 60-cycle was completed. Included in this change-over was the installation of 15 General Electric super-synchronous motors, complete with across the line starting equipment. Automatic push button control was used throughout the en-

tire plant. (6) Approximately 80 De Laval worm reducer units have been installed in various locations. Each unit consists of a motor, and reducer, connected by a flexible coupling and mounted on one base. Belt drives have been practically eliminated. (7) The installation of another packing unit, consisting of two Bates packers, necessary conveyors, elevators, siding, etc. has been begun and will be completed during the winter. This is a fair sample of how some of the older plants are being put on a par with the newest.

North American. Now installing an Edge Moor waste-heat boiler power plant at Security, Md., plant.

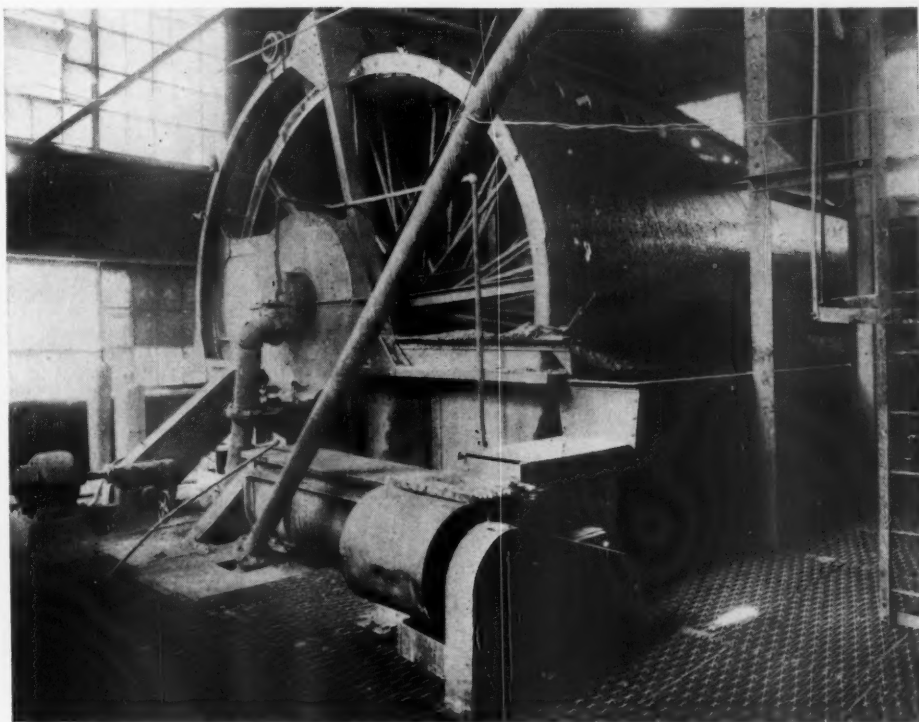
Old Mission. Merged with the Pacific Portland Cement Co., Consolidated, and numerous improvements made.

Olympic. Opened a new quarry with new equipment, including an electric shovel. Installing equipment to make "Velo" quick-hardening cement.

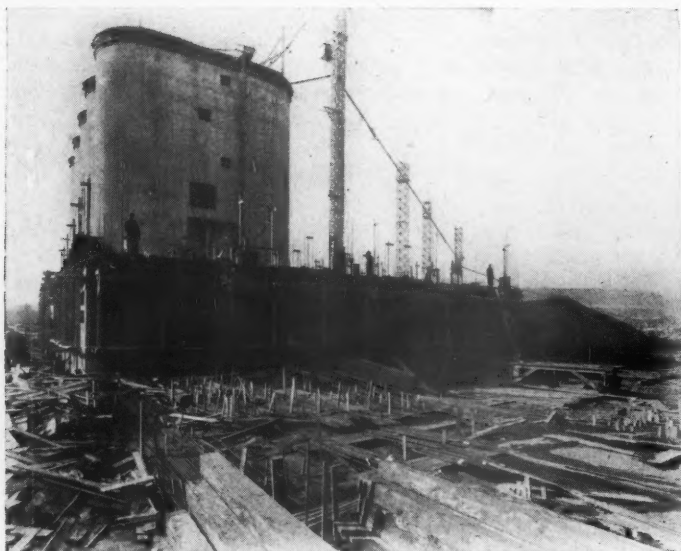
Pacific. Redwood City, Calif., plant capacity increased from 2700 to 6000 bbl. per day by installation of two new kiln (10 ft. by 11 ft. 3 in. by 235 ft.) and grinding equipment. Reported to have purchased 2800 acres of limestone property near Mojave. Capacity increased 700,000 bbl.

Peerless. Building new concrete silos for 330,000 bbl. storage of cement, giving total storage capacity of nearly 550,000 bbl.—over one-third the capacity of the plant, probably the largest storage facilities for plant capacity of any mill in the United States. Began the manufacture of "Super Cement."

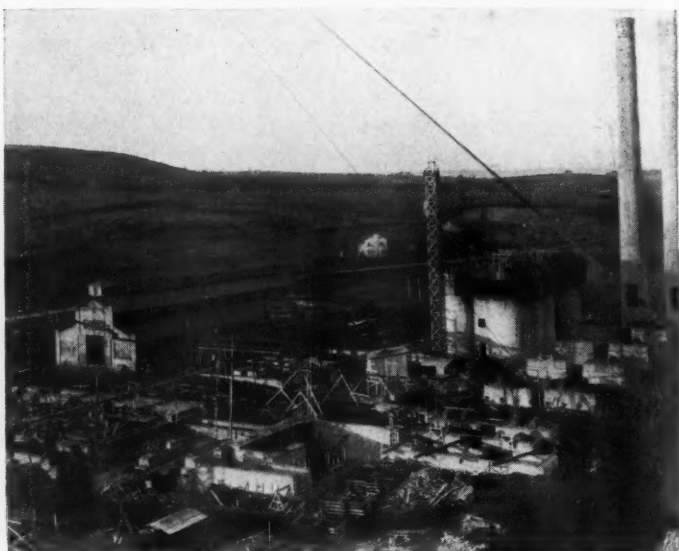
Pennsylvania-Dixie. Completed installation of 10x11 ft. 3 in. by 343 ft. 9 in. kiln, new crushing equipment and new storage facilities at Richard City, Tenn. At Clinchfield,



Recent slurry filter installation at the Columbia cement plant of the Pittsburgh Plate Glass Co.



Construction view of the new Keystone Portland Cement Co. plant, Bath, Penn.



Keystone Portland Cement Co. plant at Bath, Penn.; quarry is across concrete road

Ga., plant the installation of a third kiln and mill equipment was completed, increasing the plant capacity 500,000 bbl. (described in *Rock Products*, August 6).

Phoenix. New plant at Birmingham, Ala., went into production in March. Limestone, sandstone and shale are the raw materials. Noted for very large manufacturing units—kilns 10 ft. by 11 ft. 3 in. by 343 ft. 9 in.; compeb mills 8x7x40 ft.; a storage basin for slurry 200x25x21 ft. Wet-process; kilns have a reported output of 2100 bbl. per day each. Capacity 1,300,000 bbl. (described in *Rock Products*, June 25).

Pittsburgh Plate Glass. Many changes and improvements including new kilns, a Babcock and Wilcox waste-heat boiler plant, slurry filters (Oliver) and new silos and packhouse. Capacity doubled (from 800,000 bbl. to 1,600,000 bbl.). A description of the changes and additions will appear in the January 7 issue of *Rock Products*.

Pyramid. Went into receivership for a total judgment of \$1,045,333.

San Antonio. Entire plant practically rebuilt and enlarged, including a new 7x45-ft. Traylor compartment mill for finish grinding (was fully described in *Rock Products*, October 1).

Sandusky. Completed installation of American slurry filters, Bay Ridge, Ohio, plant, with other improvements. At Dixon, Ill., is adding another Edge Moor waste-heat boiler.

Santa Cruz. New raw grinding units installed (Hardinge conical mills) with conveyor equipment.

Southwestern. New 7x40-ft. compeb mill installed at Victorville, Calif., plant.

Standard Lime and Stone Co. A newcomer, began producing at Martinsburg, W. Va., in October. Capacity 300,000 bbl. A single-kiln plant designed primarily to dispose of quarry spalls, for which no other profitable market could be found.

Super Cement. The Super Cement Co., Detroit, Mich., is introducing the manufacture of an English invention for grinding with portland cement clinker a definite quantity of treated gypsum, known as Catacoll. Catacoll is produced by mixing together in definite proportions certain grades of tannin and plaster of paris. The prepared admixture ground with portland cement clinker has a catalytic effect on early high strength development, density, etc., of the resulting concrete. To November 3, the following portland cement companies had been licensed to make "Super Cement" under United States patent protection: Bessemer, Lawrence, Marquette, Peerless and Vulcanite.

Superior (Ohio). The portland cement plant formerly operated as a subsidiary of the Wellston Iron Furnace Co., Wellston, Ohio, has been incorporated as the Superior Cement Co.

Superior (Washington). New large slurry tanks and other improvements have been



Another view of the Keystone Portland Cement Co. plant showing both quarry and the town of Bath

added, including quarry equipment.

Sun. Merged with the Oregon Portland Cement Co. Capacity increased to 700,000 bbl.—an increase of 300,000 bbl.

Trinity. New Houston, Tex., plant began producing in October. Oyster shells and clay for raw materials. Very large manufacturing units; kiln is 11x300 ft.; Traylor compartment mills, 8x40 ft. (described in ROCK PRODUCTS, December 10). Capacity, 600,000 bbl.

Universal. Completed 525,000-bbl. silo storage at Universal, Penn.—said to be the largest reinforced concrete silo storage for cement in the world; the silos are 40 ft. diameter by 80 ft. high. They are filled by a 10-in. Fuller-Kinyon pumping plant. A new packhouse with six 3-tube Bates valve-bag packers was included in the improvement. At the Buffington, Ind., plant a \$2,000,000 harbor development, including stone handling and conveying equipment was completed.

Valley Forge. A newcomer, the Valley Forge Portland Cement Co., began production at West Conshohocken, Penn., in August. The plant is remarkable in many features (described in ROCK PRODUCTS, October 29). Raw material is a metamorphosed limestone of about correct proportions. Manufacturing units are widely scattered on rough ground. The kilns are the first installation in America of the Polysius Corp.'s "Solo" kilns. They are of three different diameters, a cooling section 9 ft. 10 in. by 31 ft.; a burning section 11 ft. 10 in. by 50 ft., and a preheating section 8 ft. 10 in. by 142 ft., wet process. Capacity, 800,000 bbl.

Virginia (subsidiary of the International Cement Corp.)—Six new 30x80-ft. concrete silos (100,000 bbl. storage) added.

Vulcanite. Began the manufacture of "Super Cement" in portion of old No. 1 mill, which was abandoned some years ago; has added new grinding machinery, packing machinery, etc., to handle the new product.

Warrior. An entirely new plant has been built to replace the older one; the capacity has been increased from 1500 to 3000 bbl. per day (500,000 bbl. a year); a thoroughly modern dry-process plant with several unique features—waste heat used for rock dryers (described in ROCK PRODUCTS, August 20).

West Penn. A newcomer, the West Penn Cement Co., began production at West Winfield, Penn., in April. Limestone and shale are the raw materials; wet process; kiln is 11 ft. 6 in. by 250 ft. and produces 2000 bbl. per day. Compeb mills are 8x30 ft. Capacity, 600,000 bbl. (described in ROCK PRODUCTS, July 9).

Yosemite. A newcomer, the Yosemite Portland Cement Co., began producing in September. Limestone and clay are the raw materials, wet process; kilns are 10x240 ft.; compeb mills are 7x26 ft. Capacity, 800,000 bbl. (described in ROCK PRODUCTS, June 11).

Summary of New Plants

The following chronological summary of new plants is interesting:

March	Phoenix	1,300,000 bbl.
April	West Penn	600,000 bbl.
May	Cumberland	800,000 bbl.
	Basic	600,000 bbl.
June	Louisiana	800,000 bbl.
July	Great Lakes	2,300,000 bbl.
	Federal	1,200,000 bbl.
	Dewey	1,000,000 bbl.
August	Valley Forge	800,000 bbl.
September	Yosemite	800,000 bbl.
October	Florida	1,500,000 bbl.
	Trinity	600,000 bbl.
	Standard	300,000 bbl.
December	Colorado	1,000,000 bbl.
Year's total		13,700,000 bbl.

Plants Under Construction

The following plants are under construction (including additions to existing plants) and expected to be producing in 1928:

American. The American Portland Cement Co., Los Angeles, Calif., is reported to have let contracts for a single-kiln plant near Devore, San Bernardino county, California. The following is official, from Briant S. Young, president of the company: "Our plant will have a capacity of 2000 bbl. per day (600,000 bbl. per year). The product will be gray, waterproof cement, using the wet process. The principal purpose of this plant is to supply cement to what will be known as the "Houghton products plants." Each of these plants (they are to be located about Los Angeles and other southern California cities) will manufacture concrete products of a patented nature for ordinary house and general building work.

Arkansas. The Boettcher (Ideal) interests of Denver, Colo., are building a new wet-process plant near White Cliffs, Ark. (1,000,000 bbl.).

Ash Grove. A wet-process plant of 750,000 bbl. capacity is under construction at

Louisville, near Omaha, Neb. It is expected to be in production by the fall of 1928.

Dewey. Announces extensions and improvements of Buffalo (near Davenport), Iowa, mill to increase capacity from 3000 to 5000 bbl. per day (600,000 bbl.).

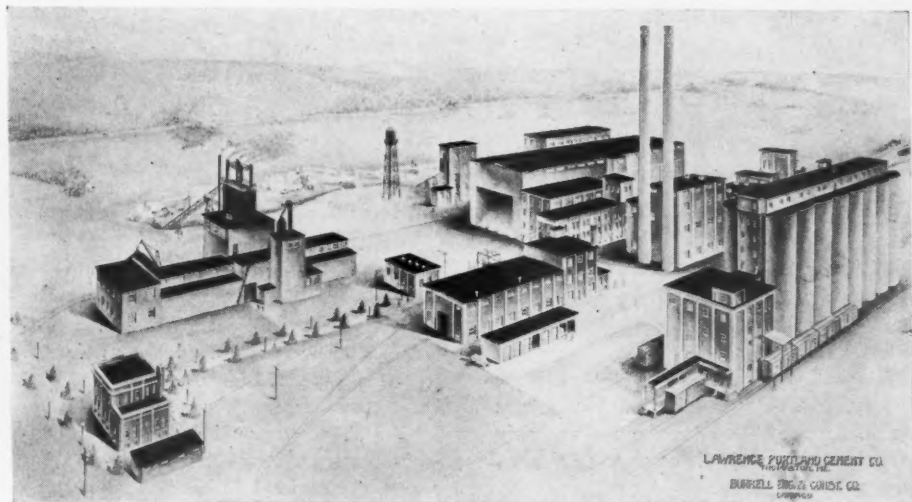
Keystone. The Keystone Portland Cement Co., Allentown, Penn., has work well under way on its new wet-process plant at Bath, Penn. The following is official, from F. B. Franks, vice-president: "We are installing in the crusher building, what is known as the 'Zet' crusher, which prepares the material for the grinding mills in one performance.

"We are installing 43-ft. 'Solo' mills in our raw and clinker department, Solo kilns 250 ft. long, 13 ft. 3 in. in diameter in the clinkering zone. These will be the largest diameter kilns installed in any cement plant in the United States at this time. Our coal grinding department will have Solo mills also. The plant, when completed, we believe, will be dustless as the various departments will be equipped with dust collectors. We are figuring on manufacturing the highest quality cement which can be made by the wet process.

"The grinding machinery and conveying equipment was purchased from the Polysius Corporation, Dessau, Germany, and Bethlehem, Penn. The electrical equipment was purchased from the General Electric Co. The steelwork is being erected by the Bethlehem Construction Co., Bethlehem, Penn. The substation and raw and clinker mill will be covered with a gypsum roof. The coverings for all the buildings are being furnished by the Keasby & Mattison Co., Ambler, Penn., who are supplying asbestos cement corrugated sheathing.

"The two concrete stacks were erected by the Rust Engineering Co. The M. A. Long Co., Baltimore, Md., are the general contractors. Richard K. Meade & Co., of Baltimore, Md., are the consulting engineers.

"From present indications we believe we will have the plant completed so we can



Artist's rendering of the new Lawrence Portland Cement Co. plant, Thomaston, Me., now under construction

manufacture cement the latter part of March." (Estimated capacity 1,000,000 bbl.)

Lawrence. The Thomaston, Maine, plant of the Lawrence Portland Cement Co., is well along, and probably will be in production by the summer of 1928. The kilns are 11x200 ft. and the compeb mills 8x7x40 ft.—all Allis-Chalmers Manufacturing Co. equipment. (Estimated capacity, 1,000,000 bbl.). This plant is notable as the first to be built in the New England states.

Mathieson Alkali. It is reported that con-

tracts for a new 400,000 bbl. wet-process plant near Laramie, Wyo., in October.

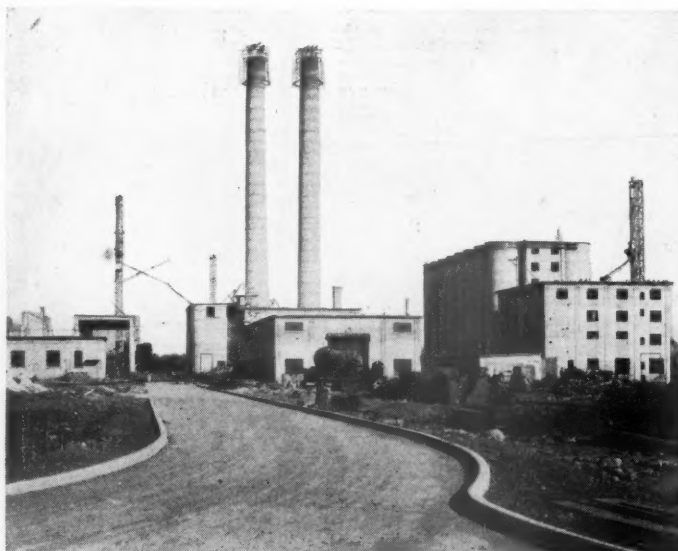
Northwestern. The Northwestern Portland Cement Co. has a 500,000-bbl. wet-process plant under construction at Grotto, Wash., which is expected to be in production early in 1928. The kiln is 11 ft. 3 in. by 240 ft. and the mills are 7x40 ft. compartment mills. The major equipment is being supplied by the Traylor Engineering and Manufacturing Co.

Sandusky. The Sandusky Cement Co. is

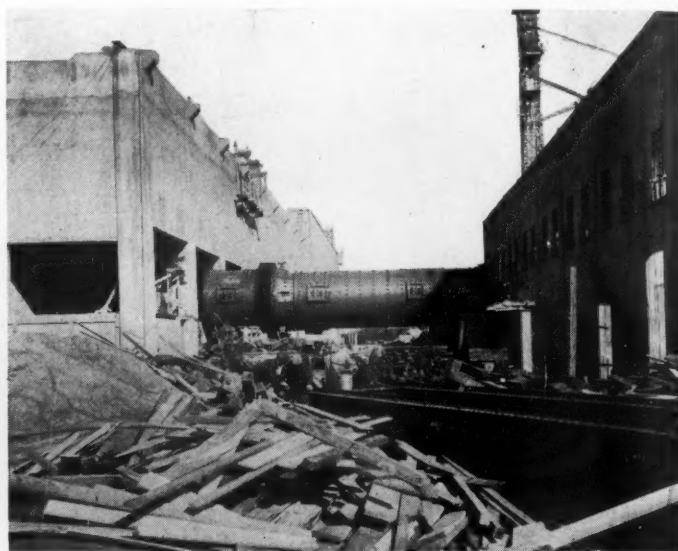
handling and cooling equipment are being furnished by the American Miag Corp. The plant's capacity will be about 1,000,000 bbl., and it is expected to be in operation about April 1.

Projects in Various Stages of Development

Following are 20 projects for portland cement plants, some of which may be dead and others dormant. A few probably will materialize in 1928.



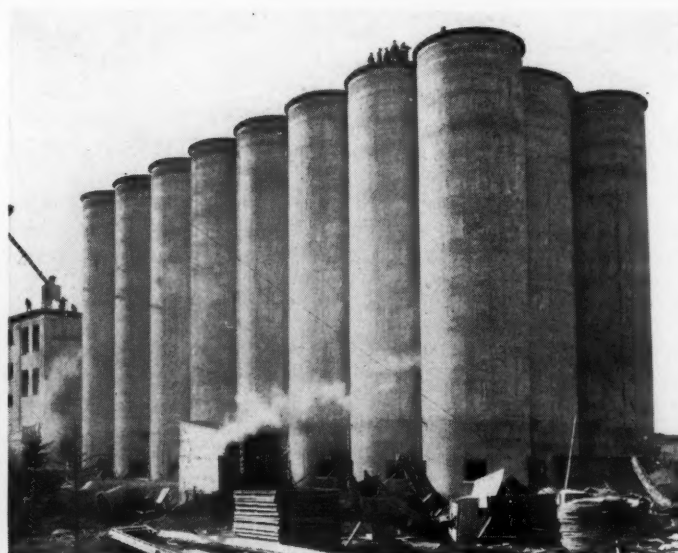
Construction view of new Lawrence plant at Thomaston, Me.



Another view of the Lawrence plant under construction



Recent view of the Lawrence plant in Maine



Silos of the Lawrence plant at Thomaston, Me.

struction has begun on a 1,000,000-bbl. wet-process plant at Saltville, Va., by the Mathieson Alkali Works, New York City—a by-product utilization proposition.

Missouri. Construction work is well under way on a new plant at St. Louis, Mo., to manufacture "Velo" cement—an early high strength portland cement (estimated capacity 600,000 bbl.).

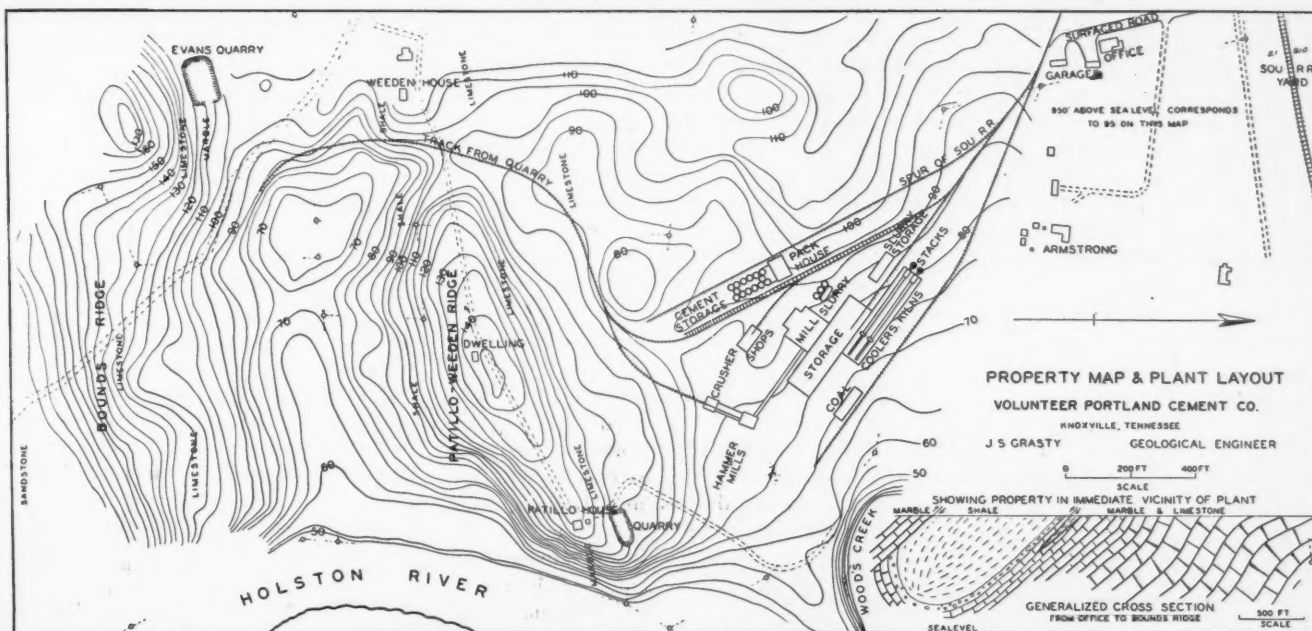
Monolith. The Monolith Midwest Portland Cement Co., Los Angeles, Calif., let

building a two-kiln wet-process gray portland cement plant at York, Penn., where its white portland cement plant is now located. It will include slurry filters (United Filters Corp.). (Estimated capacity, 1,000,000 bbl.)

Volunteer. The Volunteer Portland Cement Co. has construction of a new wet-process plant at Knoxville, Tenn., well under way. The mills will be the Unidan type of F. L. Smidth & Co.; the kilns are 11x215 ft., Vulcan Iron Works; conveyors, clinker

American. The American Portland Cement Co., New York City, has done some promotional work in connection with a projected portland cement plant at Foreman, Ark. The last accounts were that property had been purchased (estimated capacity, 1,000,000 bbl.).

Aransas Pass, Tex. The Western Development Co., Los Angeles, Calif., is reported to have purchased large oyster-shell deposits at Aransas Pass, near Corpus Christi, Tex.,



Volunteer Portland Cement Co. plant near Knoxville, Tenn.

for a cement plant project. Coy Burnett, formerly of the Monolith Portland Cement Co., is said to be one of those interested. (Capacity, 400,000 bbl.)

Carolina. J. A. Acker and S. E. Flexer of the New Egyptian Portland Cement Co., Port Huron, Mich., are reported to be interested in a cement plant project at New Bern, N. C. (estimated capacity, 1,000,000 bbl.)

Columbia. The Columbia Cement Co., Portland, Ore., has been reported as projecting a plant at Huntington, Ore. This project has not appeared in news dispatches for several months and may have been abandoned, in view of the two other projects in the Northwest. (Estimated capacity, 600,000 bbl.)

Commonwealth. The Commonwealth Portland Cement Corp., of Boston, Mass., was incorporated in Delaware in August. L. L. Griffiths, formerly of the Michigan state

cement plant, is said to be interested. The reported site of the projected plant is North Adams, Mass., where a plant has been talked about for 20 years or more (estimated capacity, 600,000 bbl.).

Dayton. The Dayton Portland Cement Co., Dayton, Ohio, was incorporated over a year ago, to build a projected plant at Germantown, Ohio. Nothing has been published in regard to its plans for over a year (estimated capacity, 600,000 bbl.).

Georgia. The Georgia Portland Cement Co., organized over a year ago to build a plant at Sandersville, Ga., is still in the promotion stage. A 1,000,000-bbl. plant is projected. H. K. Ferguson Co., Cleveland, Ohio, are the contracting engineers.

Guadalupe. The Guadalupe Portland Cement Co., San José, Calif., has not been heard from for several months, but is reported to be an active project (estimated capacity 1,000,000 bbl.).

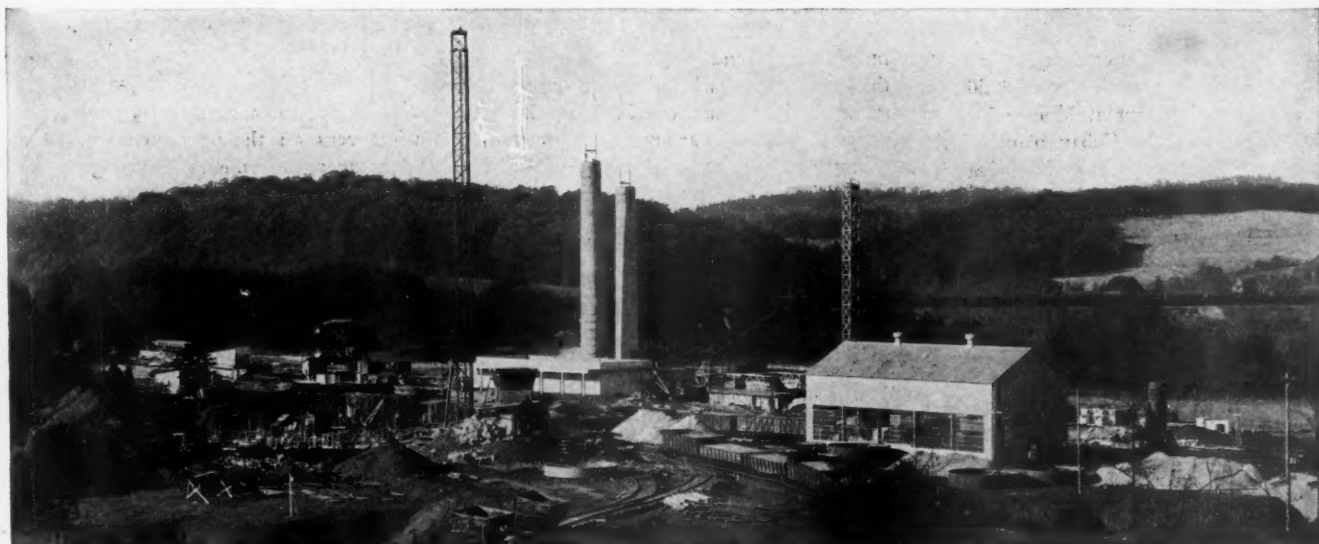
Gulf Coast. The Gulf Coast Shell and Cement Co., Houston, Tex., was reported in March to be contemplating the erection of a cement plant at Houston—now believed to have been abandoned.

Idaho-California. A project to build a portland cement plant at Lewiston, Idaho, is being kept alive under the name of the Idaho-California Cement Co., by Los Angeles interests.

Lime Products. The Lime Products Co., Little Rock, Ark., were reported in June to be contemplating the erection of a 500,000-bbl. plant at Whitecliffs, Ark.

Mississippi. The projected plant of the Mississippi Portland Cement Co. to build a plant "somewhere in Mississippi" has not appeared in news items for over a year, but it is believed the project is still alive.

Missouri. The Missouri Portland Cement Co. is said to be the owner of 1000 acres of Limestone property near Batesville, Ark.,



General view of construction work on Volunteer Portland Cement Co. plant

and local rumors persist that a cement plant will sometime be built there.

Pacific Coast. The Pacific Coast Cement Co., a subsidiary of the Pacific Coast Co., Seattle, Wash., large operators of industrial properties in the Northwest, has definitely announced plans to start construction at once of a 1,000,000-bbl. plant at Seattle. Limestone will be brought 600 miles by boat from quarries in Alaska. An initial bond issue for \$2,000,000 has already been floated. The Cowham Engineering Co., Chicago, are consulting engineers.

San Pedro. Aman Moore and associates, of Los Angeles, Calif., are reported to be projecting a cement plant at San Pedro, Calif. Harold C. Day, of the Utah-Idaho Cement Co., is said to be interested.

Tampa. Reports were current in April that Amos E. Pinchot, New York City, and other capitalists were contemplating building a portland cement plant near Tampa, Fla.

Tennessee Coal and Iron Co. Rumors have been current at Birmingham that the Tennessee Coal and Iron Co., a subsidiary of the United States Steel Corp., contemplated building a portland cement plant at Old Jonesboro, near Birmingham. These rumors have been partially denied, however, in that immediate construction is not contemplated.

Universal. Land has been bought, but construction work has never started, on a projected new plant of the Universal Portland Cement Co., at Cleveland, Ohio.

Valley. The Valley Portland Cement Co. is a Los Angeles project to build a plant at Three Rivers or Goshen Junction, Calif.

Canadian Developments

The chief event in Canadian portland cement history in 1927 was the sale of the Canada Cement Co., Ltd., to new interests. Two new projects have been reported as follows:

Canada. The Canada Cement Co., Ltd., Montreal, Que., is to spend \$1,000,000 on an addition to its Winnipeg, Man., plant.

Natiara. The National Cement Co., Montreal, Que., is planning to add 300,000 bbl. capacity to its plant at Montreal.

The capacity of the Cuban plant of the International Cement Corp. is being increased by the installation of a fifth kiln.

Technical Developments

The practically unanimous opinion of manufacturers themselves is that the outstanding technical development of the year was the strenuous effort to make better cement without increasing the price to the user. Of course, this effort was not confined to the year 1927, but it may be said to have reached a place of universal acceptance by cement manufacturers in 1927.

All the new plants that we are familiar with are able to make a 3-day cement—a cement that will give present 7-day strength

requirements in 3 days. It is rumored throughout the industry that a new plant which cannot make a cement of early strength requirements had better not be built. As to what has brought about this marketing of early high strength cement at no greater price than the A. S. T. M. standard portland cement there is some difference of opinion. It seems to us more a matter of voluntary competition on the part of manufacturers than any really widespread or insistent demand on the part of users.

There is not, so far as we can determine, any proof that early high strength portland cements are of any greater ultimate value in construction than ordinary portland cement; and there is a possibility, although not a probability, that early high strengths are attained at the cost of ultimate strength and permanency in the resulting concrete. The belief in early high strength portland cement appears to be founded on the theory that the most active and desirable component in portland cement is tri-calcium silicate. The proportion of this component may be increased by fine grinding of the raw materials and a higher lime content; the finer grinding and greater refinement in proportioning and burning will bring about the combination of more calcium silicate in the tri-calcium silicate ratio. There are other ways of accomplishing the same result, and doubtless still more will be discovered. Finer grinding of the cement up to a certain point helps in making the cement quicker acting—at one new plant this was determined to be 88% through 200-mesh; beyond this point the cement became too fine for the water to react on it readily; and for perhaps some other reason as well, there was no increase in the activity or resulting strength of the cement mortar from grinding beyond this fineness.

To a certain extent then, early high strength in portland cement is an index of the care and thoroughness used in its manufacture. With it goes also the assurance of greater uniformity, because of more accurate chemical control. Other things being equal, it is obvious of course, that the user will demand early high strength, if he can obtain it at the same price as slower hardening cements, until it may or may not be definitely proved that such early high strength cements are not equal to the standard cement in permanency or ultimate strength. There is no question that it will be more costly to the manufacturer to furnish early high strength cement in place of the present standard material, but it is less costly to make it in the new plants specifically designed for this purpose, than in the older plants. Consequently, as the number of new plants increases the pressure on the older ones becomes greater.

The competitive situation is somewhat obscured by special cements such as high alumina cement, and standard portland ce-

ment with patented admixtures or catalysts. If nothing else the latter serve as a ready means for manufacturers to market an early high strength, so-called waterproof cement, pending such time as they may be able to bring their entire output up to such standards, should future demand require this. It may prove, of course, that the cheapest and most feasible way to make early high strength, or more active, portland cement, is by the use of chemical catalysts either mixed with the cement or with the slurry or raw materials.

There is obvious reluctance on the part of both manufacturers and users to recognize early high strength cements by specifications which would give the inference that such cements are better than present standard portland cement. In the present state of knowledge of the product it would be hazardous to set up standards for quick hardening cement, when what is really desired is *quick hardening concrete*, which may be attained by various and entirely different methods (such for instance as more standard cement to the mix, manipulation of the mixture, longer mixing time, use of calcium chloride, etc.) Moreover, no one wants to sacrifice the well established qualities of portland cement that passes present standard requirements, even for early hardening. In other words, it is very generally recognized that all methods of attaining early high strength concrete are experimental at the present time.

However, the manufacture of early high strength cements has given a great impetus to research work and study of portland cement at almost every plant in the industry, and for that reason has already had an enormous influence in bettering manufacturing technique of all portland cement, by bringing about greater care in its chemical control; there is every prospect that this will continue to be the case, and that the greatest good that can come to the industry from this source is better technique, rather than recognition of a variety of special cements.

Effect of Special Cements

Some typical comments by portland manufacturers on their attitude toward early high strength cements follows:

"We believe that the use of many of the so-called 'super' cements is fraught with great danger. Undoubtedly it is often economical to use a product like high alumina cement, which while more expensive delivers the value in certain kinds of work, and is *not* sold as portland cement."

* * *

"This phase of constant efforts to improve quality without increased cost emphatically obtains, with much that is chemical—tentative and theoretical—associated with the development. We believe the ultimate effect of early high strength cements, 'super' cements, etc., on the in-

dustry will lead to better portland cement rather than the development of special cements. We believe the trend is broadly toward general improvement of quality, and not within narrow or specific limits."

* * *

"In most cases increased quality has been brought about by increased cost without increase in the selling price, which has resulted in a smaller margin of profit. We do not believe so-called 'super' cements will be an important factor in the industry, and the manufacture of them has led to much high quality portland cement which is evolutionary rather than revolutionary, and is consequently sound."

* * *

"The development of early high strength cements is along correct lines, but the 'super' and other like names I believe to be only sales talk and will soon be dropped."

* * *

"As a rule you can not improve the product without increase in cost. It is debatable whether the ultimate effect of early high strength cement will be to better the quality of all portland cement. Our opinion is that present standard specifications assure quality sufficient for ordinary uses of cement."

* * *

"It is a very dangerous assumption that the ultimate effect of early high strength cement will be to better the quality of all portland cement."

* * *

"Probably the ultimate effect of early high strength cement will be to better the quality of all portland cement, but this will depend in large measure on whether the 'super' cements can or can not be manufactured at comparable costs."

* * *

"It is a mistake from the standpoint of economics to make portland cement better than required for 90% of its uses, if this involves increased cost. There should be separate specifications and a recognized price differential for high early strength cement."

* * *

"The high test cement will cause a better grade of portland cement to be manufactured."

* * *

"We believe the manufacture of early high strength cement will lead to better portland cement; but also the 'special' cements have come to stay."

* * *

"I believe that the strenuous efforts being made to produce high early strength cement will result in a better portland cement rather than in special cements, produced by the addition of materials to hasten the set, subsequent to calcination."

* * *

"The development toward better portland cement should be kept within bounds

where the price to the consumer will not be increased to a point of discouraging general use."

* * *

"Better cement had to be made to satisfy the user. The price was secondary. The increase in quality has been marked for the last 2½ years. We do not believe a better cement is likely soon—that is better than a portland cement made as it should be made."

* * *

"Technical research has developed splendid results in improved quality. We think the tendency of early high strength cement will be to improve all portland cement, and that this is sound. Some think we are moving too fast, but this is an age of progress."

* * *

"The effect of early high strength cement and so-called 'super' cements has already been to improve all portland cement."

* * *

"We do not believe the ultimate effect of early high strength cements will lead to better portland cement. Better portland cement will be, in fact is being, developed; and there will be a corresponding development in special cements."

* * *

"The ultimate effect of early high strength cements and so-called 'super' cements will be to lead to the development of better portland cement, and to the elimination of so-called 'super' and special cement."

* * *

"Improved quality requires increased efforts in all departments of the mill. This raises costs and will probably be reflected in the price. Manufacturers generally are striving to improve their product. The demand is for early high strength concrete. To satisfy this requires the ideal true portland cement, or tri-calcium silicate. In our opinion this ideal product can be produced only through employing a special process of manufacture. There is a wide market for cement of this character."

* * *

"I regard the strenuous efforts of manufacturers to produce a better portland cement as a phase of competition. The actual result has been, of course, to reduce the margin between cost and net received. I fear that the cost of portland cement will be increased by reason of the increased strength requirements to the point where its use will be affected. We do not know very much as yet in regard to the ultimate strength of these special cements; but I believe as a general proposition there is not a great difference between present standard portland cement and the special cements at the end of a considerable period of time. Certainly in most cases where cement is used standard portland cement will meet every requirement of the user; and in those few instances where a higher

early strength is needed, it can be procured by the use of a small additional percentage of standard portland cement. It seems to me, so far as the public is concerned it would be better served with a lower cost cement rather than a higher strength cement."

* * *

Research

A summary of research work in the portland cement and allied industries appears elsewhere in this issue. The outstanding development in portland cement research in this country was the establishment of research laboratories for work on concrete and cement by two of the country's largest manufacturers—the Lehigh and the International. Doubtless many other companies are engaged in research work on a smaller scale, but these two laboratories are on a scale and in charge of men that place them on a par with the research laboratory of the Portland Cement Association.

It is a natural and logical development for a cement manufacturer to want to do research work on his own cement, and since cement cannot be practically studied except in relation to its use in concrete, it is natural that these laboratories be equipped for research work in concrete. Hitherto practically all such research work of members of the Portland Cement Association has been done in the Association's own laboratory, which has come to be looked upon as the fountain head of all knowledge on portland cement and its use. What will be the effect of the establishment of such private company laboratories on the portland cement industry? Some opinions by cement manufacturers follow:

"The activities of one company in this direction will certainly beget similar activities from all up-to-date competitors."

* * *

"There is a very decided tendency on the part of individual companies to engage in extensive research work."

* * *

"Speaking as a salesman I believe the cost of selling is too high for the amount of business at this time."

* * *

"Since the world war, as is generally known, the research laboratory of German origin has been transferred to America and today is accepted as the foster parent of industrial progress."

* * *

"We are not aware of a tendency for individual companies to engage in extensive research work. It would have a disrupting effect. Research in concrete should be concentrated in the Portland Cement Association."

* * *

"Such individual research will ultimately result in the efforts of the manufacturer being much more nearly directed toward the manufacture of a product fitting the consumer's need."

"This is as it should be and will put the industry on a more scientific basis."

* * *

"Individual research will have a tendency to help cement up to high standards."

* * *

"Will produce better work and develop additional uses for concrete."

* * *

"Better use of cement with better results on jobs and perhaps greater markets."

* * *

"Keep the industry on its toes and alert."

* * *

"To greatly increase the use of cement."

* * *

"Beneficial."

* * *

"It will force other manufacturers to do more research work."

* * *

"An improved product and improved methods of using."

* * *

"This will bring about a better grade of cement."

* * *

"Should be very beneficial."

* * *

"In my opinion this is as it should be; each company should do its own investigating along with the Portland Cement Association; it will have a very beneficial effect on the industry."

* * *

"I am more inclined to the idea of cooperative research as being soundest."

* * *

"Think this will be limited to large companies. Smaller ones can not afford the expense."

* * *

"I believe there is a tendency for individual companies to engage in extensive research work in concrete, as well as in cement. It will result in progressive plants maintaining a specialist, who is able to show conclusively wherein the cause for failure in a certain job lies, and to suggest methods that will eliminate the cause."

* * *

"May help as long as nothing radical is done."

* * *

"What is the effect of more knowledge on any subject?"

* * *

"It cannot but help better cement and concrete, and that is for the good of the industry."

* * *

"This will help if it is not too much laboratory."

* * *

"Beneficial. We know very little about cement. Continued investigation will strengthen the fact that it is the best building material known."

* * *

"Will improve the industry by resulting in better cement."

"It should better the industry."

* * *

"An improvement of product and service to the public. Compare with the electrical industry."

* * *

"Will have no marked effect on the industry."

* * *

"It will undoubtedly better the quality, and this in time will increase the consumption, because the increased quality in time increases the confidence of the buying public in portland cement."

* * *

"Improved concrete and consequently many additional uses, all tending to increase the demand for cement."

* * *

"I believe that all research work will be for the ultimate good of both the manufacturer and user of cement. I question, however, the possibility of individual companies, except very large ones, engaging in research work that will be of any material value to themselves or to the industry. Such work, it seems to me, can best be carried on through the laboratories of the Portland Cement Association, so far as concrete is concerned, and through the fellowship which the Association has established at the Bureau of Standards insofar as cement is concerned. Certainly from an economical point of view cooperative research is best. I regard the establishment of research laboratories by individual companies as a new phase of competition. It provides a selling point, which at times has a little weight."

* * *

It is evident from the foregoing opinions and from many others which simply state that individual company research is "a good thing," that few have considered the competitive feature of company research laboratories. Potentially they hold out great possibilities in developing and increasing knowledge in regard to cement and concrete. But if they become service laboratories to help in the solution of the problems of the company's customers they also become a very powerful weapon in modern competition, which places a high value on customer service, as well as on quality of product.

The most valuable thing the Portland Cement Association has had to sell is the product of its research work—an expert knowledge of cement and its use. It has given the Association a large part of the prestige it enjoys with the public, as well as with engineers, architects and contractors. It remains to be seen whether an individual company laboratory is capable of giving that company some of the prestige that attaches to the Association's cooperative research work. The situation is obviously fraught with much danger to smaller producers in the industry unless individual company research is confined within rather narrow limits.

Wet vs. Dry Process

For several years past the wet-process advocates have so predominated in the industry that it could almost be concluded that eventually all plants would be made wet-process. Two dry-process plants, that we know of, were converted to wet-process in 1927. It had come to be quite generally conceded that the more accurate chemical control, the more thorough blending of the raw materials, was more nearly foolproof in wet than in dry plants. It would now seem from methods of dry-raw-material blending developed during 1927 (described elsewhere in this issue) that at least this objection to the dry process has been removed. There yet remains the objection that dry-process clinker is alleged to be harder to grind. One new dry-process plant, that of the Colorado Portland Cement Co., at Fort Collins, Colo., was built in 1927, incorporating some of these new ideas; and its operation may cause some revolutionary changes in present ideas regarding the merits or demerits of the two processes. In any event the last word is yet to be written in this long drawn-out controversy.

Bigger Plant Units

Of course, an outstanding technical, or manufacturing, development in 1927 was the tendency toward very large kilns, ample slurry storage, and large 3-compartment mills. There is evidently no agreement as to the proper economic dimensions of kilns, for those installed in 1927 vary from former standards of 10 x 150 ft. to 11 ft. 3 in. x 343 ft. In American-made kilns the breadth of the country is the apparent limit in length, but the 11 ft. 3 in. diameter has been fixed by the limits of railway clearances on bridges and passing tracks. The German made kilns being installed at the new Keystone plant, Bath, Penn., are 13 ft. in diameter in the burning zone. It is our impression that the economic limit in kiln lengths has been reached and that there will be few more 343 ft. kilns installed.

In the case of mills, the 7 x 8 x 40 or 45 ft. three-compartment mill seems to be generally accepted as a forward step. An even larger compartment mill has been built. Nevertheless, reference to the description of new plants shows that the standard 7 x 26 ft. two-compartment mill is still popular. The use of roller bearings in these mills is not a 1927 development, although it received considerable publicity in 1927 owing to the equipment of a 9x10x45-ft. compartment mill with roller bearings. These huge mills are requiring the installation of very large motors, 800 to 1500 hp. A new type "Hytork" synchronous motor developed by the Allis-Chalmers Manufacturing Co., is direct-connected to some of these large mills without the use of a clutch, magnetic or otherwise.

There is some divergence of opinion in

the industry in regard to economic limits of very large mechanical units. The manufacturer with a relatively small production will well consider the desirability of tying up his entire output to the performance of a single large unit or two. There is also the question of purchased power vs. waste-heat power. In the latter case there is usually a surplus, so that the possible power economy of very large units is offset.

As regards larger facilities for storing slurry, probably no step has had a greater influence toward a better and more uniform product. Where it is possible, as at the new Phoenix plant in Birmingham, to store 8 days' supply of slurry ahead of the kilns, it is obvious that variations in the raw mix may be reduced to a minimum. Much of the development at older plants has been in the direction of greater slurry storage and blending facilities.

Some comments by manufacturers on large mechanical units follow:

"We believe as you do, that the tendency toward very large mechanical units has reached its limit—at least for the time being."

* * *

"You are wrong in your conclusion regarding very large mechanical units, as the savings from these are substantial when the increased quality is taken into account."

* * *

"The limit has been reached. In some cases it is not necessary to take such a large kiln as 330 ft. to show that economy has been over-reached."

* * *

"The limit has been reached, particularly kiln length."

* * *

"We believe the limit has been reached so far as kilns are concerned; as to large grinding mills it is still questionable."

* * *

"Unable to say. Our kiln has recently been lengthened from 200 to 240 ft. with increased efficiency and economy, when increased output is considered."

* * *

"Depends on power situation. Large units are desirable in combination with low cost purchased power, not with waste heat power."

* * *

"Long kilns are not the success claimed for them, as I know of kilns of average length (11 x 175 ft.) using the same rock, that have the same output as the longer kilns. The same is true with very large mills; these units are being overdone."

* * *

"Under present conditions I believe that the limit as to length of kilns has about been reached."

* * *

"We don't know. If 330 ft. is better than 175 ft., why not kilns 660 ft.? Ultimate economy is the goal."

"The economy of large units is substantial. The present large units are comparatively new, but present limits are not likely to be extended for some years to come."

* * *

"At present it is a matter of personal opinion. Units as large as 330 ft. kilns have not operated long enough for definite results, but in our opinion have resulted in only a slight reduction in cost."

* * *

"We believe the economic limit has been reached, although kilns 390 ft. long are being installed in a plant in England. In our opinion they are not justified from the standpoint of savings realized."

* * *

"My impression is that the economic limit has been reached, and that the large mechanical units do not give the additional economy, which has been claimed for them. I want to except very long kilns, because I do not have any real knowledge as to just what economy may be realized in such machines."

* * *

There has been some progress in dust prevention, or dust collection. New wet-process plants are about as free from dust, as it would seem possible to make them. Two or more types of mechanical dust arrestors for hot stack gases have been brought out in 1927 which give promise of coming nearer the solution of this perplexing problem than previous experiments. There seems to be some doubt arising in the industry as to whether the stack dust returned to the kiln does the cement any good. However, economic or not, dust elimination at plants near cities will doubtless be a necessity.

Electrical Precipitation in the Cement Industry in 1927

The application of electrical precipitation in the portland cement industry has gone forward less rapidly than the application in the metallurgical industry, where large quantities of metal values can be recovered. Nevertheless steady progress is being made and at the present time the gases from over 100 kilns, with an output of close to 100,000 bbls. per day, are being cleaned by the Cottrell electrical precipitation process. These installations are in many instances also treating the gases from the stone and clay driers.

With an adequate central dust recovery installation, all mill equipment can be vented and the dusty air can be sucked up at every point and carried into the flues leading to the central dust recovery apparatus. A cement plant can be made as dust-free as most other industrial plants, and although few factories have gone this far in the cleaning of their mills, nevertheless the tendency is in this direction, and a number of factories have already gone so far as to come close to the desired goal of a thoroughly clean factory.

The electrical precipitation process lends itself to the complete cleaning up of mills, because the apparatus is not sensitive to temperature fluctuations, and in a properly designed plant gases from all sources in the mill can be carried to a central treating plant. There are several installations in operation now where the gases from kilns, stone driers, clay driers, coal driers, and grinding equipment are all combined in a general collecting flue which feeds the precipitator, this apparatus in turn discharging to a single general stack.

During the year 1927, three new installations in the cement industry were placed in operation. The precipitator at the Knickerbocker plant of the International Cement Corp., went into operation early this year. This plant precipitates the kiln gases from a production of approximately 5,000 bbls. per day, wet process, the total gas volume treated being approximately 250,000 cu. ft. per min. This precipitator is of the graded resistance type and operates with a high degree of efficiency.

The precipitator at the new Fort Collins plant of the Colorado Portland Cement Co. was placed into operation recently. This precipitator treats the kiln gases and drier gases for a production of approximately 3000 bbl. per day, dry process, the total gas volume handled being approximately 200,000 cu. ft. per min. This installation is also of the graded resistance type.

The new precipitator at the Redwood City plant of the Pacific Portland Cement Co. treats the gases from the two additional kilns recently installed. This is a wet process plant, and as oyster shells and marl are used as raw material, the gases contain an exceptionally large amount of soda and potash fume, and this precipitation installation is, therefore, of particular interest. The first precipitator installed to treat the gases from the first two kilns, treated the gases after they had passed through a washing tower, the fume being collected wet. In the new installation, the material is collected dry. This precipitator is of special design, collecting electrodes being of metal. The gas volume treated in this plant is somewhat in excess of 100,000 cu. ft. per min.

These recent precipitation installations will be described at greater length in subsequent articles.

General

The general design of portland cement plants has become more standardized than in several years past. The nucleus of every design now is a huge raw material and clinker storage shed, served by an overhead bridge crane. The various manufacturing units are usually grouped about this storage, either on parallel or right-angle axes, so as to have a minimum amount of material handling.

Financial and Economic Phases

An analysis of the 1926 balance sheets of 14 portland cement companies operating 42

plants made by ROCK PRODUCTS during the past year gave the following:

Total rated annual capacity 42 plants	51,850,000 bbls.
Book value of real estate, buildings and equipment.....	\$112,843,544.00
Equivalent to per bbl. annual capacity	2.176
Book value of all assets, including inventories, working capital, etc.	151,946,970.00
Equivalent to per bbl. annual capacity	2.93

As to value of securities issued, for nine companies operating 32 plants, we find:

Total rated annual capacity 32 plants	39,000,000 bbls.
Book value of real estate, buildings and equipment.....	\$ 85,367,580.00
Book value of all assets.....	118,806,084.00
Market value, June 1, of common stock	78,737,181.00
Market value, June 1, of preferred stock	18,161,028.00
Par value of funded debt.....	12,965,100.00

Total value of securities, June 1	\$109,863,309.00
Equivalent to per bbl. annual capacity	2.817

These figures are in close agreement, so then we may assume that in round figures the total investment in the cement manufacturing industry in the United States is approximately \$3 per bbl. of capacity, or for an estimated total capacity at the end of 1927 of 225,000,000 bbls., \$775,000,000. Of this amount approximately \$18,000,000 was placed with the general public in 1927. The total in portland cement securities now held by the investing public is estimated at about \$150,000,000, so that it is plain that the great bulk of investment in cement securities is still in the hands of the men who are actively engaged in the industry, or of those closely associated with the industry.

The question naturally arises, is the industry in a sound condition with a peak demand of 170,000,000 bbls. in 1927 and a producing capacity of 225,000,000 bbls.? The steel industry has been able to operate for periods at as low as 50% capacity, if not with profit, at least with few failures. Can the portland cement industry operate profitably at 75% or less capacity with any profit? Obviously cement plant owners and operators are the ones to answer this question. This is what some of them say:

"Our impression is that the relationship of supply to demand leaves the portland cement industry relatively sound; but the inroad of foreign cement, which has seemed to make necessary drastic reduction in prices in various portions of the country, would tend to make us look upon the coming year as one which is likely to be less profitable than the present. We think most plants could operate satisfactorily on 75% capacity, but of necessity this would increase the cost of production."

* * *

"As a business entity the industry can operate and cohere at 75% capacity or less; profits of course will be as variant as may be production."

* * *

"The industry should be able to operate at 75% capacity at a profit, but it is doubtful if it will."

"The condition of the industry is relatively sound provided each manufacturer will recognize the over-capacity and limit his activities accordingly. Otherwise over-production will bring an inevitable trade war in which few companies will be able to make interest on their investment. The situation is not comparable to the steel industry because we have no unit in the industry comparable to the U. S. Steel Corp. as a stabilizing influence and because of the tremendous abundance of raw material available for new cement plants the industry is constantly threatened by more over-capacity."

* * *

"Some plants will be able to operate at 75% capacity, but there are a number that are too near their cost of production when at full capacity to last long."

* * *

"Can operate at 75% capacity at increased cost of production."

* * *

"Can operate at 75% capacity provided selling price is on a profitable basis."

* * *

"The industry is relatively sound, but if much more production is put on the market sections which are not well guarded by protective freight rates will suffer, and in those districts the industry will become unsound. The industry should be able to operate on a 75% of capacity basis if not over-capitalized."

* * *

"The industry should be able to operate at 75% capacity; in the north heavy productive capacity with very limited winter business tends to hold down this 'load factor.'"

* * *

"Overproduction, present and proposed, is a very serious menace to established plants. The industry cannot operate profitably at 75% capacity."

* * *

"The industry can operate profitably at 75% capacity if the pirates and cut-price companies will be satisfied with a fair share of the business."

* * *

"Increase in cement consumption demands a production in excess of present demand. A number of old obsolete mills will undoubtedly cease to operate within the next year or two."

* * *

"The industry is relatively sound, but the amount of new production indicates an excess of optimism that will almost certainly have unsatisfactory reaction, especially along the coasts where foreign cement is also a factor in the situation. It is not a parallel case to the steel industry. The steel output is from a comparatively few producers and prices are subject to some control, whereas cement mills are numerous and the prices go wild in times of over-production. Competition resolves itself into price-cutting."

"The cement industry can be operated at 75% capacity provided some of the weaker small companies are eliminated or absorbed into the stronger companies."

* * *

"Some plants can operate profitably at 75% capacity, while others cannot."

* * *

"Do not think the cement industry could operate at 75% capacity without radical realignment."

* * *

"In our territory the industry is *relatively* sound; but note I italicize 'relatively'—an important qualification. Operation at 75% capacity is on the margin of safety."

* * *

"We think the industry is relatively sound and can operate at 75% capacity profitably, if it will."

* * *

"I think if a cement plant is carefully managed it can operate at less than 75% capacity and still have a margin of profit."

* * *

"What percentage of steel production is in the control of a single producer?"

* * *

"I do not believe the industry can operate much below 75% safely."

* * *

"Well built, properly located plants can earn fair returns on the present basis."

* * *

"The industry is relatively sound. New production is more or less localized, and in some cases takes the place of the antiquated plants. Volume will continue large but profits smaller. The companies can operate at 75% capacity profitably if they have the will to do it; anything to the contrary is simply a selfish excuse."

* * *

"The industry cannot operate at less than 75% capacity without sharp increase in present prices."

* * *

"Old plants could not compete on a 75% capacity basis."

* * *

"The portland cement industry has in the past operated at 75% capacity, and in some cases a trifle higher percentage of capacity, with a margin of profit, and with less efficient methods of production. There need be no radical readjustment, and there is no reason why the cement industry cannot continue to operate profitably."

* * *

"In a general way the industry is sound, but excess capacity built in locations not warranting such increased capacity, plus imported cement competition in the East and South has demoralized conditions. Because all portland cement is sold under standard specifications it is more sensitive to market variations than steel. The very low prices now prevailing, due principally to competition of imported cement, renders it difficult if not impossible to operate at 75% capacity and return a profit."

"I cannot agree with the impression that the condition of the portland cement industry is relatively sound in spite of the large new production in 1927. I do not believe that in my experience there has ever been a time when there was more unrest in the industry than there is at the present moment. In many cases there is complete disregard for recognized business principles. Unless this tendency is checked, it seems to me that we are bound to have prices on a basis which will eliminate any return to those who have invested their money in the industry. Many manufacturers on the present basis of price are finding it difficult to get along. I do not believe the cement industry can operate under 75% capacity on a profitable basis. Perhaps some of the very modern plants would be able to live on prices that would be made if less than 75% of the capacity of the industry were utilized. I think there is no parallel with the steel industry. It is much older; it has gone through many periods of stress and is composed of larger units. All these things, it seems to me, make for stability."

* * *

The New vs. The Old Plants

It is not safe to make any general assumption that new plants are more efficient and have lower costs than some of the older plants. One of the things the portland cement industry has been remarkable for is the constant modernizing of older plants. Moreover, generally considered, the companies which own the older plants are much more firmly entrenched in the trade, and are stronger financially, than some of those owning the newer plants. Some comments on this phase of the industry are:

"We think there is a parallel condition as between an old plant kept modern, with large production, and the new plants of today with small production. The first produces cheaper, but goes farther to market its output, than the latter."

* * *

"It is our opinion that smart, resourceful salesmen of machinery will prove potent factors, backed by economic need, in bringing old, obsolete plants down to date in modern equipment."

* * *

"A good many of the late changes are not yet proven advances. We have seen a number of improvements that were to revolutionize the industry come and go."

* * *

"We know of several old plants operating at a much lower cost per barrel than some of the new ones."

* * *

"Do not think new plants threaten the existence of the older ones but old established plants having a developed market will be required to install the latest equipment and keep plants up-to-date."

"We doubt if the new plants threaten the existence of the older plants, though there has undoubtedly been some increased efficiency and reduction in cost."

* * *

"The older plants are being kept modern by replacing old machinery with modern and economical machinery, as replacements become necessary owing to the usual wear and tear."

* * *

"Some of the lowest cost plants in the industry are very old plants which have been modernized only at essential points."

* * *

"The older plants will be obliged to make alterations in order to cope with advantages the newer plants enjoy."

* * *

"We doubt if all the new mills will make the grade; the older mills are well entrenched."

* * *

"Many of the old plants are modernized to the extent of permitting economical operation."

* * *

"There is no place in the modern structure of the portland cement industry for inefficiency."

* * *

"Plants built six to ten years ago did not materially affect the operation of plants built prior to ten years earlier."

* * *

"Conservative manufacturers provide against obsolescence and at the same time maintain their properties at a high state of efficiency. All such have nothing to fear from new plants."

* * *

"A very large amount of money has been spent within the last five years in modernizing old plants, and, in my judgment, many of these old plants are now equipped to meet, or nearly meet, the manufacturing costs of the new plants. If this conclusion is not correct, then there is only one answer, and that is the replacement of old plants by new ones. In the long run it will not be possible to maintain a basis of price which will give to one plant a bare living and to another a large profit."

* * *

"Some of the old plants have very low costs and very low investment also."

* * *

Possibilities of Cost Reduction

When an industry faces conditions of over-production, shrinking prices and profits, interest in cost-reduction possibilities grows accordingly. The portland cement industry has already made such tremendous progress in this direction that one might conclude that there would be a general feeling that the limits were in sight. Apparently this is not the case. Unfortunately, it seems to us, nearly all thought of cost reduction is concentrated in the operating departments. Operating men justly

say, sometimes, that there are fully as many opportunities for economies in sales and distribution as in production. A few comments:

"Manufacturing arts are not run in grooves of satisfied sufficiency."

* * *

"We do not see any revolutionary changes in prospect now, but one can never tell when they may come."

* * *

"In the more recent plants a very high degree of efficiency has been reached, and unless the process is radically changed, which is improbable, I do not look for much further cost reduction."

* * *

"Still a big margin for reduction of fuel costs."

* * *

"Production cost in modern plants has practically reached bottom, without substantial reduction in fuel cost."

* * *

"Anything is possible—the foresighted manufacturer is always looking around to cut costs."

* * *

"Increased efficiency should be possible in both old and new plants, and of course revolutionary changes in an industry are always a possibility of the future, but we see no probability of any such changes at an early date."

* * *

"Gradual improvements will probably be forthcoming."

* * *

"From a manufacturing standpoint I think cost reductions in the future will be small and low. Sales costs are too high due to intensive sales propaganda by all the companies."

* * *

"Further refinements are apt to increase costs."

* * *

"Have about reached bottom as to cost of production. Next move must be to reduce cost of selling."

* * *

"Believe the manufacturing cost will continue downward for standard cement, but the tendency is to make it better, not cheaper; not looking for any revolutionary changes."

* * *

"No great changes are likely in our present methods; some new process may be developed."

* * *

"Cost tendency is downward. Larger tube mills and kilns are the ultimate solution."

* * *

"Nearly reached a point where cost reduction is practically impossible without revolutionary changes in the industry. Such changes are likely to be made."

"To cause a radical reduction in cost would necessitate a revolutionary change, but what revolutionary change is there in sight?"

* * *

"Improvements in manufacturing processes are constantly being introduced—most of which tend to reduction in cost.

But the increased costs of labor, fuel and supplies have more than offset the savings realized. We look for no radical change."

* * *

Conclusions

So many factors are involved in the present problem of the portland cement industry that we would be rash indeed to

hazard any guess as to their solution. Most of its problems are perhaps common to many industries at the present moment, but they are only made more complicated by the unstable position of the product itself. Cement manufacturers are engaging in a gigantic competition on *quality* before any real *measure* of quality has been developed.

Slate Industry Made Real Progress in Operating Methods in 1927*

Structural Slate, Particularly, Made a Good Showing

By J. R. Thoenen

Mining Engineer, Nonmetallic Minerals Station, Bureau of Mines

STRUCTURAL AND ELECTRICAL SLATE materials have made slight increases over 1926 in volume of sales, although prices have not materially changed. The first ten months of 1927 showed an increase of roughly 3,000 sq. ft. sold over the same period of 1926. Milling capacity was 20% to 25% greater than the market required, and in consequence working time

manufacturing processes were made, especially in interior and exterior architectural materials. The objection to the use of slate for interior decoration owing to its dark color has been largely removed by recent development in exceedingly artistic and stable decoration. Natural slate provides an excellent medium for the application of newly devised surfacings effectually overcoming former objections. A recent development is its increased use by architects for interior and exterior window sills, as well as interior trimming.

As the year closes, the Structural Slate Co. of Pen Argyl, Penn., reports the receipt and confirmation of the largest single order for structural materials in its history.

Sales of school blackboards have not been as great as in past years, probably owing to a slump in the building of schools. However, recent orders indicate a revival and extension of this business as indicated by shipments to the west coast for use in the Hawaiian Islands and displacement of some of the business formerly enjoyed by imported Portuguese slate in the western states.

Roofing Slate

The position of roofing slate is somewhat different. This material largely produced by hand methods is subject to more intensive competition. As a result, the past year has witnessed a rather destructive price-cutting war, until at the present time roofing slate is in many instances being sold at prices less than the cost of production.

Various attempts to remedy this condition have been attempted both in Vermont and Pennsylvania fields, and it is rumored that mergers of the principal operators in the Vermont section have been accomplished. A similar movement is rumored as on foot in the Pennsylvania field, although no definite accomplishment has been made as yet.

Reports from the Virginia section give evidence of a progressive spirit of develop-

ment, indicating materially increased production in the near future. The LeSueur Richmond Slate Corp. is taking the lead in this movement by the operation of two steam shovels in overburden removal in preparation for increased 1928 production.

The Chapman Slate Co., of Bethlehem, Penn., has completed the steel work on a new mill at its plant at Chapman's Quarry, Penn., for the manufacture of large sized heavy slate for use in roofing large mill buildings, such as steel mills, etc. This is a new departure for slate roofing and should prove interesting to those requiring durable and fireproof roofs in large construction.

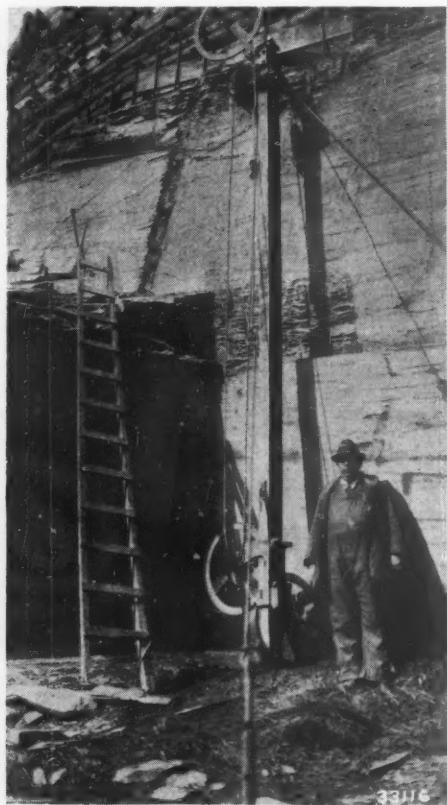
Wire Saw a New Development

An interesting development in the quarry technology has been the successful advent of the wire saw in the Pennsylvania district. Since its introduction at the Colonial Slate Co. quarry at Wind Gap, Penn., by the Nonmetallic Station of the U. S. Bureau of Mines, at the end of the season of 1926, six companies have purchased and installed equipment. Various additional operators have expressed their indorsement of the wire saw by ordering equipment for delivery early in 1928. This equipment has proven both more economical to operate as well as much less wasteful in slate production both in the hard and soft vein slates.

At a meeting held in Easton, Penn., in December, 1927, sponsored by Committee D-16 of the A. S. T. M., representatives of the cement, steel and slate industries of the Lehigh Valley of Pennsylvania were hosts to a number of people interested in those various industries. At this meeting plans were laid for a three-day meeting for the latter part of April, 1928, to visit cement and steel mills and slate quarries.

There has been no notable increase in the sale of slate granules nor slate flour for 1927.

With stabilization of prices on roofing slates the prospect for increases in volume of sales for 1928 is indicated.



Wire saw completing a cut 9 ft. deep and 80 ft. long in a slate quarry

was curtailed that amount to prevent overproduction.

Notable advances in the technology of

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Sand and Gravel Production More Than Any Previous Year

About 6% General Increase Reported Although Prices Lowered Somewhat—Better Business Expected in 1928

QUESTIONNAIRES sent out by ROCK PRODUCTS in the latter part of 1927 were so well answered by producers of sand and gravel that their reports cover almost one-half of the production of the country, 46.7%. From these it is estimated that the production of 1927 was about 6% greater than that of 1926. If the estimate of the Bureau of Mines, which shows the production of 1926 to have been 183,100,818 tons, be taken as a base, the 1927 production may be estimated at 194,000,000 tons.

Producers generally report a healthy state of the industry, the increase being noted from almost all parts. Regarding the price received at the plant, something over half the producers reporting said it was too low. In the Central states, where a very large part of the production is concentrated, 71.2% of the producers said it was too low, and in the Trans-Mississippi states, where the production is largely of sand, 87% said it was too low. By "too low," as some of the producers were careful to explain, is meant that the price is at or near the cost of production, so that there is no margin for profitable working, and in some cases an actual loss was claimed.

Industry Not "Overplanted" Except in Spots

This year public statements were made, notably in the mid-year meeting of the National Sand and Gravel Association, and in the meetings of the Missouri Valley Sand and Gravel Producers Association, that in some parts of the country there were many more plants than were needed to supply the market. Recognizing the importance of knowing whether or not such a condition existed generally, the questionnaires sent to producers covered this point. The replies show that as a whole the country is not "overplanted." Producers pointed out that at times contractors could not obtain materials, and one or two producers even said that more plants, to produce the better kind of materials, were needed. But from certain parts of the country the replies were such that it cannot be doubted that these particular sections have more plants than producers can find markets for. This situation is worse in California than elsewhere, for a survey (not a guess) shows that the existing plants could produce three times what the market could take. An "overplanted" condition exists to a lesser degree

in Massachusetts, Illinois, Missouri and Oklahoma.

This situation it is believed will be somewhat alleviated in the coming year by a better market. While an overwhelming majority of producers said they looked for the same or a little better market and price to prevail in 1928, in some of the sections from which excess plant capacity is reported there were hopes of more business at a better price. In part these hopes were based on better business conditions in general, and in part upon the prospects for enlarged highway programs. Justifying this hope, the state of Illinois has recently announced that 1100 miles of concrete highways are to be built and that Cook County, containing Chicago, is to spend \$15,000,000 in widening the highways that approach the city. In Oklahoma the settlement of political troubles is expected to bring a resumption of highway construction, and in Missouri there is a possibility of another road bond issue. But in California, where the excess plant

capacity has been responsible for sporadic price wars that have occasionally driven the plant price well below the cost of production, there seems to be no hope of an improved condition, if the opinion of the producers themselves be taken at full value.

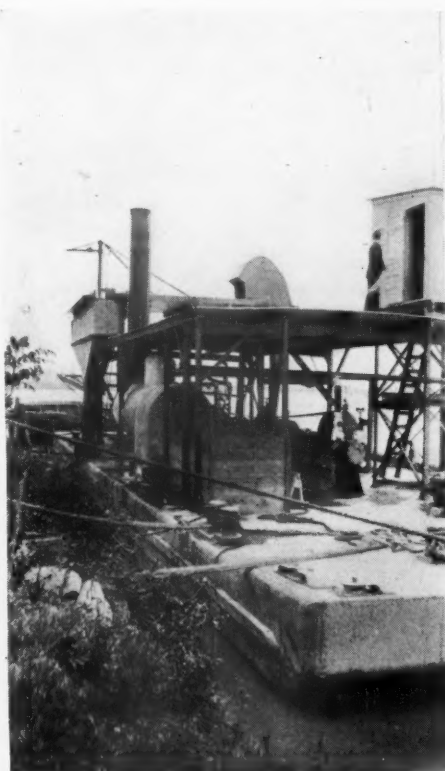
In answering 1926 questionnaires, very few producers made any complaint of freight rates, but in 1927, 23.5% of them said they thought freight rates were unfair. In explanation some said that rates on sand and gravel were too high as compared with rates on other commodities, but others complained of actual discrimination, that is, rates which would permit competitors to enter their territory at more favorable rates than they could enter the competitor's territory. In part, as a few producers pointed out, this may be due to the fact that rates are being adjusted in many parts of the country and the adjustment has not yet been equalized.

The competition of materials from way-side pits, temporary plants and state-owned plants appears to have been little more than an annoyance in 1926, but in 1927 it assumed serious proportions. The condition was worst, perhaps, in one central state, where almost half of the material that went into highways came from such sources. In another state, producers complained that temporary plants which were set up beside every paving job were given the preference by the engineer in charge. In still another state it was complained that state plants were a real menace to the highway aggregate industry. Producers seem agreed that the way to remedy this condition is to have those in charge of buying highway material apply the same rigid inspection to the way-side pit and casual production that is given the production of established plants.

Research and Technical Progress

In research commendable progress has been made this year, especially by the engineering division of the National Sand and Gravel Association, which has collected information of great value to producers and published it in bulletins. This has been highly appreciated not only by the members of the association but by the industry in general. To carry on this work to more definite conclusions, a laboratory is needed and the money is being raised by subscriptions from individual members and associations.

Among the local associations the work of



New dredge of the Pioneer Sand and Gravel Co., showing the unique screening device



Plant of the Associated Gravel Companies, near Coyote, Calif.

the engineering department of the Missouri Valley Sand and Gravel Producers Association should take first place. It is promoting the use of better aggregates by giving actual comparisons both of laboratory results and of work in the field. It has boldly disregarded the idea that it was dangerous to show any failures in concrete, for fear of prejudicing the public against the material, and has shown how such failures have occurred when unsound, dirty and improperly graded aggregates have been used.

The specification-making bodies do not appear to have made much advance during the year. The difficulty of making a specification that will really specify and yet be one which can be applied to the varying conditions formed throughout the United States, grows rather than lessens as the problem is studied. At the same time it is not believed to be an insoluble problem, and the next year may show considerable progress in solving it.

New Methods and Practices

Nothing startling or even very new has appeared in 1927 in either the methods or the practices of the sand and gravel industry. The tendency seems to build better plants along fairly conservative lines. Construction and equipment are decidedly better and the plants of the year are evidently put up to produce during the entire life of the deposit.

There is something of a tendency to the simplification of plants, and this is especially noticed in the new plants of the Montgomery field in Alabama. All the new ones are of much simpler design than the plants they replaced.

The tendency to build better plants along conservative lines is shown in the smaller plants even more than the larger. The "trucking plant," that is, the plant with no facilities for shipping otherwise than by trucks has made a firm place for itself in the industry. Naturally, it must have a relatively small production, as the area into which it can ship is limited. But it makes up for this in some other ways. The best

of such plants are now built of steel, their design is as carefully worked out as that of a plant for ten times the capacity would be, and some attention has been paid to appearance so that the plant may not be an eyesore in a locality that is usually being built up quite rapidly. All this is shown in the illustration of the plant of the Hartman Bros., near Detroit (designed by the Smith Engineering Works).

In excavating methods perhaps the most important new practice is that of using trucks or trucks and trailers in gravel pits to bring the bank material to the washing plant. The use of trucks at the Whitney plant in Duluth is mentioned elsewhere. Another such use is found at the plant of the Paulsen Construction Co., Tannersville, N. Y., designed by the Good Roads Machinery Co. Trucks drive up a ramp of generous width and dump on a grizzly over the hopper.

The use of field conveyors is increasing. One unusual combination is that of a field conveyor with a cableway dragline excavator, used in the pit of the Waukesha Washed Sand and Gravel Co. at its Okauchee plant.

In dredging there seems to be a tendency to use more dredges of the clamshell and dipper type as the harder river bottoms are exploited. The pump boat, of course, is holding its own wherever the bottom permits its use, and by the employment of cutters fairly hard ground can be dug. Even where the ground is such that it slides easily to the suction, cutters are found to pay because of the uniform feed they deliver to the suction, decreasing the amount of water that has to be pumped.

The method of priming the pump by exhausting the air from the suction is greatly increasing in favor. A water jet is a favorite means of obtaining the partial vacuum needed.

The method of pumping devised by F. L. Ward of the Ward Sand and Gravel Co. has been brought to a commercial basis and it is reported that it will soon be ready for the market. It was described in the Annual Re-

view number of ROCK PRODUCTS for 1925.

Among the patents of interest to the industry issued this year is one covering the gravity screening method devised by Frederick W. Schmidt (now deceased) and W. M. Green, both of Morristown, N. J. In brief, the method consists of giving a partial screening with water followed by dry screening for the oversize, and the work is done by a flat screen followed by inclined screens over which baffles are hung to prevent the material from traveling too rapidly. Although the patent has only been issued recently, the method has been in successful use for several years in the Schmidt plant at Morris Plains, N. J.

Most Notable Plants of the Year

The usual number of new sand and gravel plants were built in 1927, but not many of them were of the large output type, that is having a capacity of 50 cars a day and more. What few of this size that were built, however, take their place among the notable plants of the country and one or two have shown a considerable advance in both design and construction.

In the Northeastern area, the leading new plant is that of the Buffalo Gravel Corp., which went into production early in the year. The designer was C. S. Huntington, engineer of the Link-Belt Co., and his problem was to include both raw material and finished product storage with loading for three kinds of delivery, water, rail and truck, and to adapt the whole to a site that was somewhat restricted in area. The result has been a perfectly satisfactory piece of material handling engineering adapted to unusual conditions. A description was published in the August 16, 1927, issue of ROCK PRODUCTS.

The new plant of the Arrow Sand and Gravel Co., Columbus, Ohio, has probably caused more comment than any plant built in recent years. It has some new and somewhat startling features of design, such as supporting the crusher floor, with four good-sized crushers, on steel bents that span the plant track. The way in which flexibility was secured is ingenious; the plant can

make a wide variety of materials, washed and unwashed (crushed gravel,) with no more change than turning the flow from one chute to another.

This plant was designed by Stephen Stepanian, the manager, who is an engineer with a long experience in material handling machinery and several years in the sand and gravel industry. A full and detailed description of this plant was given in *Rock Products* for October 15.

Another plant in the central states that was completed in 1927 and described in *Rock Products* was the new plant of the Eau Claire Sand and Gravel Co., at Chippewa Falls, Wis. It is adapted to produce both commercial sand and gravel and material for the special sands which the company makes. J. C. Buckbee and Co., Chicago, were the designers and it was described in the issue of August 20.

A rather notable storage system of Link Belt design was built by the McGrath Sand and Gravel Co. at its Chillicothe, Ill., plant. It was described in the issue of June 25.

In the South and Southeastern states several plants with capacities from 50 to 100 tons were erected. One, in Lilseville, N. C., built by the W. R. Bonsal Co., Inc., has an original arrangement of machinery that has worked out well. Practically everything in the plant except the actual machinery is of concrete. One of the best features is the sluicing flume designed to give the material a preliminary wash and also to feed it evenly to the plant. Washing has to be very thorough as the raw material contains a great deal of sticky clay. It was described in the November 26 issue.

E. T. Slider of New Albany, Ind., has built a new steel dredge and rebuilt and improved another that was put in service two or three years ago. The new dredge is of the clam shell type, a 4-yd. clamshell bucket digging the material. It is mounted on a trolley at the rear of the dredge instead of the usual derrick. The dredge bucket puts the material in a hopper from which it is conveyed by a Link Belt elevator to the screens. It has a capacity of 4 yd. per minute.

The other dredge, which has a 15-in. pump, has a new 6-cylinder Fairbanks-Morse full Diesel engine that drives the pump. A 4-cylinder engine of the same make and type drives the line shaft from which the conveying, elevating and screening machinery, and the auxiliary pumps are driven.

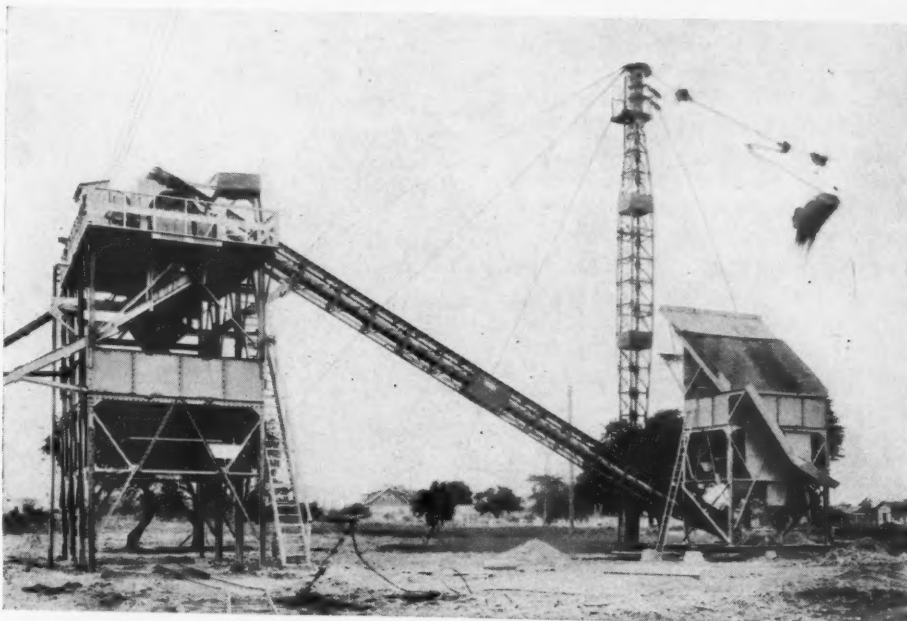
The company has also placed an order for a new steamboat which will be 145-ft. long and 32-ft. beam. It will be interesting to users of marine equipment because it has the first battery of "Shear-Klean" boilers installed on a steamboat. One set of boilers can be cleaned while steam is held on the other. The engines are compounded, with a 14-in. high pressure cylinder and 28-in. low pressure cylinder.

Several steel barges have been purchased

and others ordered. Sixteen of them are 120-ft. long and 30-ft. wide and 4-ft. deep and carry 600 tons. With these additions the business becomes one of the largest on the Ohio river.

New Plants in Montgomery District

In the district in and around Montgomery, Ala., which is the greatest sand and gravel region in the South a number of plant improvements and some new plants were installed. Perhaps the largest new



The plant of the Hartman Bros., near Detroit, Mich., is an excellent example of the well built trucking plant

plant is that of the Montgomery Gravel Co. While it is extremely well built and carefully designed, it is a very simple plant employing only one large gravity screen and two vibrating screens to make all the sizes demanded by the market. This is a dredging operation. It was described in the September 3, 1927, issue of *Rock Products*.

The Alabama Sand and Gravel Co., the oldest and one of the largest producers in the Montgomery district, opened a new deposit and erected a plant of a very simple and efficient design. Only gravity screens and vibrating screens are used. This is a dry operation the material being excavated by a drag line, a description will be published in the coming year.

Two producers put in boosting plants. One, the Kirkpatrick Sand and Cement Co. put in a floating plant with Diesel engine and a pump built up of parts bought from various makers, that is especially ingenious. The reason for using different parts was to solve the problem of passing the engine with the discharge line. A description was given in the issue of October 29, 1927.

The Underwood Walker Co. installed a booster at its Jackson's Lake plant which is on the shore and is an excellent example of what such an installation should be. The description has not yet been published.

In the Trans-Mississippi region, easily

the finest plant to be built in 1927 is that of the Whitney Bros. Co. of Duluth, Minn. This company produces sand both by dredging and by excavating a bank with steam shovels. The new plant is of standard type and equipment, but a distinct novelty in its operation is the use of trucks and trailers in the pit. A description will be published during the coming year.

On the West Coast, the most notable plant built in 1927 is that of the Associated Gravel Co.'s of San Francisco, Calif. The

plant is near Coyote, Calif., and the owner is a consolidation of four San Francisco companies controlled and largely owned by William H. Ford.

In common with many California plants, this is a double plant, producing crushed stone from boulders as well as washed sand and gravel. It was designed by J. C. Buckbee & Co., and an illustrated article by one of the designers will appear in an early issue.

Brief Notice of Other Plants

The following notes of new plants do not pretend to include all that have been built. Notice of others may be found in *Rock Products* for the year, but the news of those noted has been confirmed by letters or otherwise.

Northeast

MASSACHUSETTS. A combination of the New England Sand and Gravel Co. with concrete products plants was made and improvements effected.

NEW YORK STATE. The Laconia Sand and Gravel Co. built a 1000-ton plant near Laconia, N. Y. The deposit of 70 acres is dug by a steam shovel. Gravel is crushed and sand and gravel is washed and screened. This is a Link-Belt type of plant. The owners also operate quarries.

The Niagara Sand Corporation and the J. E. Carroll Sand Co. both of Buffalo, combined and made a number of important improvements in the Carroll plant at Franklinton, N. Y. A new steam shovel was bought for the company's plant at Attica.

The Clarence Sand and Gravel Co. of Clarence, N. Y., was formed by a merger of the Clarence Supply Co. and the property of M. P. Ryley. It is building a 2000 ton plant and will maintain a retail yard in Buffalo. This is a dredging operation.

NEW JERSEY An important consolidation of New Jersey sand and gravel producers was formed from the Bennett Gravel Co., and the Well Washed Sand and Gravel Co., of Spring Lake, and the Hause Washed Gravel Co. which has two plants at Asbury Park. These are all strong and well-established companies and the combined output will exceed 500,000 tons per year.

PENNSYLVANIA. The Allegheny River Sand Corp. completed its new, all steel dredge which it operates near Kittaning, Penn. In common with the other dredges in this part of the country, the dredge contains a complete washing plant and produces finished material for loading on barges. It is driven by a 175-hp. steam engine.

One of the most important consolidations of the year was formed when the Iron City Sand and Gravel Co. of Pittsburg, took over the Ohio River Gravel Co., of Parkersburg, W. Va. Considerable new equipment was installed and preparations made for working on an increased scale.

Rodgers Sand Co. of Pittsburg made important improvements including a new yard in Pittsburg in which steel bins, finished with steam pipes for heating aggregates, have been erected. A garage and warehouse are included.

The Norris Sand Products So., which completed its new plant last May, is making a number of improvements.

Central States

OHIO. The Kent Gravel Co. of Cleveland, built a new plant at Kent.

The Marion Sand and Gravel Co. entirely rebuilt its plant at Marion.

The Xenia Gravel Co. added a new cableway to its equipment.

INDIANA. The New Harmony Gravel Co. which operates on the Ohio river has built a new dredge and added a number of steel barges to its equipment. Improvements, including a new hoist, were made at its yards.

The Lick Creek Gravel Co. is building a new plant in the Indianapolis district.

Two new plants were erected in the Indianapolis district, one by the Indianapolis Sand and Gravel Co., the other, at Wakarusa by Brown and Rosenberger Gravel Co.

The Wabec Gravel Co., of Milford, Ind., has been purchased, and will be operated by the Neal Gravel Co., of Mattoon, Ill.

The Koch Sand and Gravel Co. of Evansville, Ind., has electrified its entire plant and added new steel barges to its equipment.

ILLINOIS. It is reported that a new plant is shortly to be built at Wayne, Ill.

The Contractors and Builders Supply Co. of Chillicothe, Ill., built a modern plant at Chillicothe which went into production early in the year.

A 1500-ton plant was built at Lisle, Ill., by T. Frank Quilty and F. G. Sullivan, of the Superior Stone Co., in the early part of the year. It is a cableway plant.

The Penville Co., of Grayville, Ill., added a large tow boat to its fleet. It is powered with a crude oil engine.

MICHIGAN. The Benzico Gravel Co. began production from its pit near Bulah, Mich. The production is said to be 1200 yd. per day.

WISCONSIN. The Elkhart Sand and Gravel Co. entirely rebuilt its plant at Elk-

hart Lake and began producing in April. The plant now is producing 20 cars per day.

South and Southeastern States

VIRGINIA. The Commonwealth Sand and Gravel Co., of Richmond, bought additional acreage and increased the capacity of its plant from 20 to 40 cars per day.

WEST VIRGINIA. The Fairfax Sand and Crushed Stone Co. built a new plant near Clarksburg, W. Va.

NORTH CAROLINA. The Southern Sand and Gravel Co. built a new plant near Sanford which went into production recently. Its initial capacity is 20 cars per day.

The Wade Sand and Gravel Co. completed its plant at Lilseville. This is an unusual plant because much of the screening and conveying equipment was designed and built by the owners. It has been running steadily since the first of the year.

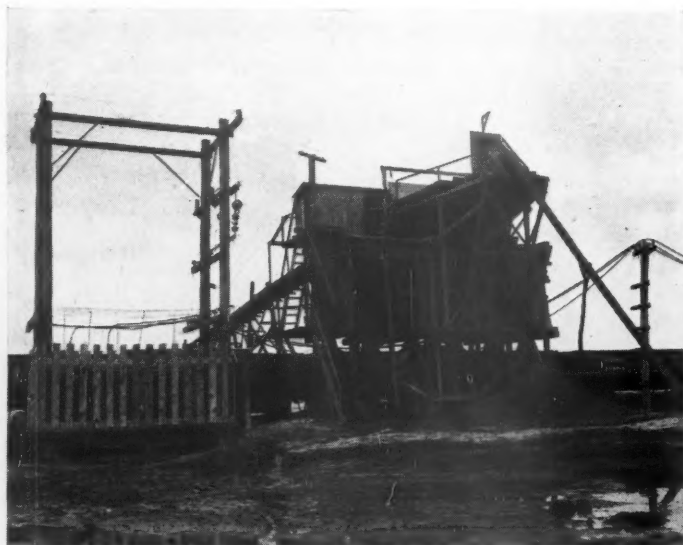
SOUTH CAROLINA. The Lawrence Stone and Gravel Co. built a new portable washer at its deposit near Eastover. This is a peculiar operation, a portable washer following a large dragline that digs the material.

KENTUCKY. The Winchester Sand and Gravel Co. added crushing and screening equipment to its plant at Winchester.

GEORGIA. The Standard Sand and Gravel Co. built a new plant near Swainsboro, Ga., which went into production recently. It is working one of the few commercial deposits of gravel which has been found in the interior of the state.

ALABAMA. The Huntsville Transfer and Building Material Co. is reported to have doubled its plant on Hobbs Island.

The Mobile Gulf and Navigation Co. added a large fleet of steel barges and two boats to its equipment. It also put up a repair shop and built a ship yard on Bayou Sarah. This company is one of the larger producers of the coast operating a fleet of dredges on the rivers above Mobile.



New plant and dredge of the Omaha Sand and Gravel Co.

FLORIDA. The Capital City Sand and Gravel Co., of Tallahassee, bought a new dredge and began operations near Bristol.

It is reported that a new company will begin operations on the Chattahoochee river in the coming year.

MISSISSIPPI. The Columbus Gravel Co. is reported to have bought additional acreage and to have increased its output from 40 to 125 cars per day.

secure material for the new addition to the prison.

The Energy Coal and Supply Co. erected a sand and gravel plant on the Black river near Keener, Mo.

The Missouri Gravel Co. has a new plant at La Grange, Missouri.

The Warsaw Gravel Co., Sedalia, Mo., moved its plant from Warsaw to a point seven miles south of Sedalia. The reason

OKLAHOMA. The Enid Sand and Gravel Co. recently began production with its new plant at Enid.

Gulf Coast and Southwest

TEXAS. The Perkins Sand and Gravel Co. is building a new plant at Calvert which it expected to have in operation December 1. It is a dredging operation and the power is from a Diesel engine.

The Columbus Gravel Co. Columbus, bought more acreage and another drag-line excavator.

Gemmer and Tanner began work on a new plant at Eagle Lake in the early part of the year. They already operate a large plant near Columbus.

The W. D. Haden Co. of Houston built a new dredge with oil engine power for producing shell, put in a new concrete products plant and made a number of improvements at their landing and retail yards.

ARKANSAS. The Wolf Creek Sand and Gravel Co., of St. Louis, Mo. began operations with a new plant at Delight, Ark. About 15 cars are produced daily.

Pacific Coast

OREGON. The Porter Construction Co. electrified its plant at Klamath Falls.

CALIFORNIA. The Union Rock Co. is reported to be spending about \$2,000,000 on improving its plants and service equipment. A 4000-ton bunker is being built in Los Angeles.

The Sunset Rock Products Co. of Hollywood built a new plant in San Fernando Wash. The output is stated to be 2000 tons per day. A fleet of 42 trucks is maintained.

The Spreckles Commercial Co. erected a modern plant near Otay, Calif. to produce crushed rock, sand and gravel. The output is 1500 tons per day.

Canada

ONTARIO. The new sand and gravel plant at Waterford (western Ontario) is expected to be in operation in the spring of 1928. The John E. Russel Co. of Toronto is building it.

Reports of Sand and Gravel by States

Northeastern States

Reports in this area were received from producers in Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey and Pennsylvania. Indirect reports were received from Delaware and Maryland.

As a whole the sand and gravel business in this area was good, but it was anything but good in some parts of it. New England producers generally reported decreased business, New York and New Jersey substantial increases in business, while about as many Pennsylvania producers reported increases as decreases. Judged as a whole, the Northeastern states may show an increased production of possibly 6% or 7%.



Trucks and trailers used in the Whitney Materials Co. gravel pit, Duluth, Minn.

Trans-Mississippi States

MINNESOTA. The J. L. Shiely Co., St. Paul, opened a new gravel deposit at its Snelling avenue plant and connected it to the plant by a somewhat novel conveyor installation. The deposit worked is separated from the plan by Snelling avenue and some open ground beyond which stood the primary crusher. The connecting conveyor had to be high enough to allow a locomotive crane to pass. So the conveyor is made with a slight bow, the highest point being where the crane passes under it in entering the repair shop.

The total length of the conveyor is about 400-ft. center to center. One 200-ft. steel truss span crosses Snelling Ave., the remaining 200-ft. being supported on bents in the ordinary way. The deposit is connected by a 150-ft. inclined belt which feeds on the 400-ft. belt. Both belts are 30-in. wide.

IOWA. The Hawkeye Material Co. of Sioux City, took over the Hills Sand and Gravel Co. and increased its production.

The Toma County Sand and Gravel Co. began operations in March. It uses an 8-in. pump.

MISSOURI. The state prison board is reported to have leased the Bagnell gravel plant for two years and will work it to

for the change was to avoid floods on the Osage river. The new plant will have an output of 15 to 20 cars per day.

The Caruthersville Sand and Gravel Co. bought the plant of the Missouri Gravel Co. (which operates other plants) at Caruthersville. The output has been increased.

The Pioneer Sand and Gravel Co. of St. Joseph built a new dredge this year. It has a rather unique method of screening by which it produces various sized products.

The Mississippi Sand and Material Co. built a fine steel dredge, which has oil engine power, and installed a material yard in which there is an unusually good conveying and material handling system. The location is on the river not far from the center of St. Louis.

KANSAS. The Kaw River Drainage board began operations with a new dredge at Kansas City, Kansas.

NEBRASKA. The All-Is Sand and Gravel Co. recently erected a plant which is now in operation.

The Sand-Gravel Co. is building its plant No. 2 at Oreapolis, Nebr. It is a dredging plant and will be an exact duplicate of the company's No. 1 plant. The company's offices are in Omaha.

D. H. Merritt and Sons have postponed the building of a plant near Lincoln, owing to the sudden death of D. H. Merritt.

MAINE. One producer reported a 20% decrease and looked for about the same business conditions and prices in 1928. There was no complaint of too many plants and business in general was good with a decreasing competition from wayside pits.

NEW HAMPSHIRE. The single producer reporting from this state said business had been the same as in 1926 and he expected it to continue that way. There was little competition from wayside pits.

MASSACHUSETTS. This state has the largest share of the New England production, and all producers reported the same or a lessened output sold. Three gave figures of a lessened production by 20%, 30% and 40%. It is evident that a large part of this decrease is due to wayside pit production, as some producers gave figures of what they had lost to the wayside pit, 25% in one case and 33% in another. Prices were thought too low by everyone, a natural result of wayside pit competition, and estimates of 20% to 40% loss of potential business because of too many plants for the market were made.

RHODE ISLAND. A limited reporting showed a 6% increase in production with good prospects and no complaints of too many plants.

CONNECTICUT. It seems that the industry is in better shape in Connecticut than in most states, for every producer reported an increase and said that prices were satisfactory with prospects for a normal business and price in 1928. There was no complaint of too many plants for the market and two or three producers said that they considered production and plant capacity to be well balanced.

NEW YORK. New York is the leading state in the production of sand and gravel, producing 13,000,000 tons of 185,000,000 total in 1926. It is probable that its production this year will be greater than last year's by at least 10%, for the producers all reported increases or the same production with one exception.

The price situation is not so good, however, as all but a few producers said it was too low for profitable business and the others would not say more than that it was satisfactory. The prospects for a better price in 1928 are not encouraging, as most producers expected it to be the same or possibly a little lower. The outlook for increased business in 1928 is considered good for the state as a whole.

Apparently the state is not "overplanted," although the producers who said so also said that there were plants enough to supply the market.

There is still some wayside competition in New York state that really affects the industry, but its effect has been felt rather more in the lowering of prices than in the decreasing of production.

Almost half of the producers said that they considered that rates were too high.

NEW JERSEY. New Jersey is another

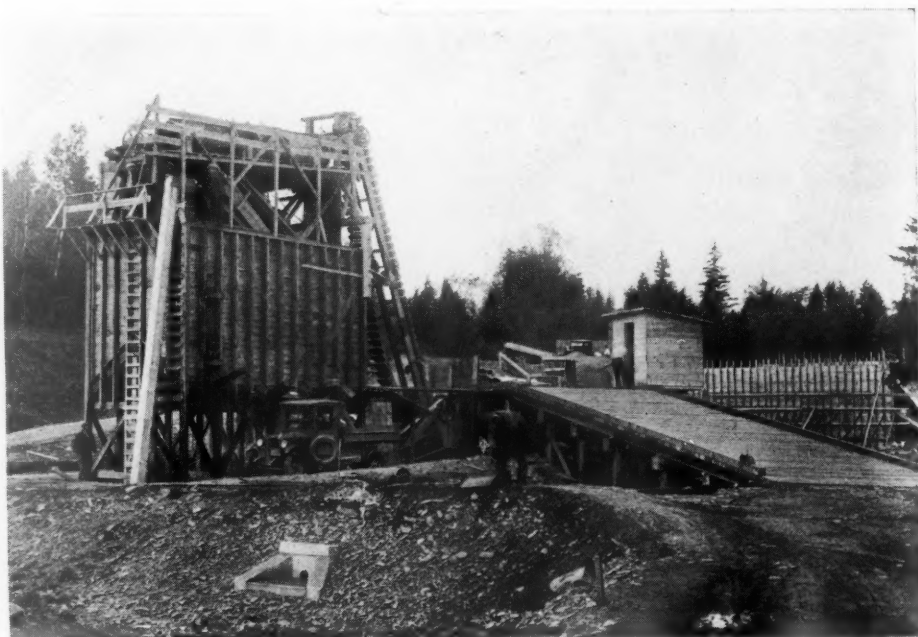
state from which practically every producer reported increased production and sales at prices that were considered fair. This state is a great producer of special sands and business in these were good except in some of the special sands used in the steel industry. It is judged that the state's increased production will be about 6%.

Very little trouble from wayside pit production was noted although almost all were agreed that there was enough of it.

Regarding excess plant capacity, opinion was about equally divided. One producer pointed out that there was excess from too large plants as well as from too many plants.

The prospects for an increased business in 1928, at the same or a little better prices, are considered good.

PENNSYLVANIA. Pennsylvania's record of production was spotty. Only 43% of the producers said that they had decreases in sales and the remainder reported moderate increases. The price was generally thought to be too low for profitable business.



Ramp for trucks, plant of Paulsen Construction Co., Tannersville, N. Y.

ness, only two saying that it was good or satisfactory.

The prospects for 1928 were generally considered good and two producers said they were preparing for a substantial increase in business.

Wayside pit competition apparently does not bother Pennsylvania producers much.

More than half the producers said that there were too many plants for the demand, but the others were quite positive that production and plant capacity were well balanced. One producer said that there were too many of the small plants that start up with limited capital and soon go out of business.

The Pittsburgh district is a big producing area of Pennsylvania, and in this particular district production was about the same as in 1926 or, possibly, a little less.

The price was fair and the prospects are for about the same amount of business next year at the same or a little lower price.

There were several complaints that freight rates were unfair, although reports were not very definite as to the way in which they were unfair. One producer said that freight rates would be satisfactory when the new scale, effective January 1, was in operation.

MARYLAND. Indirect reports received from this state are to the effect that business was somewhat better this year than last. This also applies to the District of Columbia.

Central States

This area probably produces more sand and gravel than any similar area of the United States. One of the states in it, Illinois, is the second in the production of sand and gravel, with a record not far behind New York and the remaining states, Ohio, Indiana, Michigan and Wisconsin, are not far behind Illinois.

This is one of the regions from which a complaint of "overplanting" has been received. The condition is worse in Illinois than in the other states. The complaint of too low a price to permit a reasonable profit is pretty common throughout this region, but it seems to come stronger from Illinois than from any other state. However, there has been plenty of business, even if the price was low; for most of the producers have reported either an increase or the same production as last year. It is judged that the district will show better than the 6% which is taken as the increase for the whole of the United States.

OHIO. Ohio producers must have had a very good year, for only two out of all those who answered the questionnaire said they had a lessened production. This state

contains two or three of the very large producing companies of the country and these reported substantial increases. There was less complaint of too low a price in Ohio than in the other states, but the carefully considered opinion of one important producer was that fair prices should be at least 10% higher.

The prospects for 1928 are considered excellent and it is thought that prices will be a little better. No producer thought they would be less.

judged that business was not so good there as in other parts of the state.

A considerable portion of the Indiana production is from the Wabash valley and this goes into both Illinois and Indiana. The plants of this district seem to have had a fairly good year.

The problem of Indiana is to get rid of excess pea gravel. Each year new ways are found to dispose of it profitably and there was less trouble in disposing of it this year than in former years. The installation of

business has to be divided with producers in Wisconsin and Indiana. The demand in Chicago was very good this year. Chicago prices always run low on account of the keen competition. This year it was said that they were firmer, especially on sand.

MICHIGAN. Michigan's production seems to have been spotty, some producers reporting less business, while others (the greater number) reported increases. Some of the increases were of large percentages. The same complaint of too low prices obtained as in other and nearby states. One producer estimated them to be 20% too low.

About half of the producers considered that there were more plants than were needed, showing that the situation is better than it is in some other states.

Michigan producers were almost unanimous in their opinions as to business in 1928, saying that it would be the same or a little better than in 1927.

Wayside pit competition does not amount to so much in Michigan as in other states in this region. Most producers said there were little or none of it.

There were relatively fewer complaints of high freight rates than in other states.

The big market for Michigan sand and gravel is in and around Detroit. The producers whose output goes almost wholly to this market said that business there was about the same as in 1927 or possibly a little less.

WISCONSIN. Wisconsin producers have had an exceptionally good year, according to the way they answered questionnaires, as all but one reported increases and he said his production was the same as in 1926. The increases noted ran around 10%, but one producer, who is by no means the smallest in the state, admitted that he had done 100% more business in 1927. There was not as much complaint of low prices as came from some other states.

Producers are generally agreed that there are a few more plants than are really needed to supply the demand.

Prospects for 1928 are considered to be good and all the producers but one thought that prices would be the same or a little better.

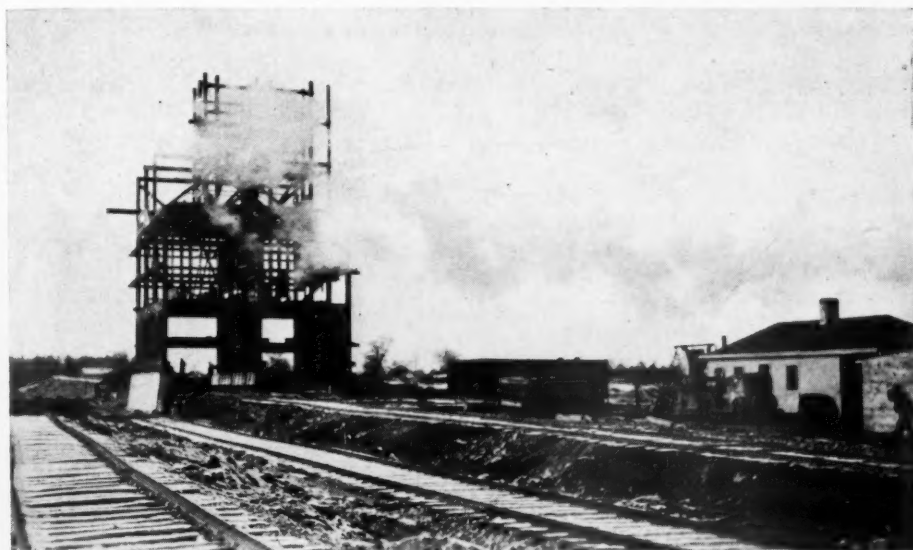
Wayside pit production is an annoyance to producers and has hurt them in what ought to be their best market, highway work. But it is hoped that this condition will be remedied in 1928.

Half the producers who reported said that they thought freight rates were too high.

Southeastern States

Producers from Virginia, West Virginia, Kentucky, Tennessee, Georgia, Alabama and Florida reported.

From Memphis south the region along the Mississippi river was affected by flood conditions. One large producer reported a loss of 75% in general construction business, but this loss was partly balanced by a heavy increase in the demand for railway ballast.



Plant of the John E. Russell Sand and Gravel Co., now being built at Waterford, Ont.

All but a few producers said that there were more plants than were needed, but they were not so emphatic in saying it as producers in some other states were.

About one-half of the producers said that they were affected by unfair freight rates.

INDIANA. Only one Indiana producer reported a decreased production, the increases reported by the others running around 10%. Prices were generally considered too low, and two producers were specific in saying this, estimating them to be 15% and 16% too low.

There does not seem to be the same complaint of too many plants in Indiana as in some of the neighboring states. About a third of the producers did not think there were too many plants for the market.

Almost all producers said that they looked for better business in 1928 than in 1927, although two of them thought it would be less by 20%. Prices were thought to be pretty firmly fixed.

Wayside pit production is a factor in the state, but most producers said that there was only a little of it. Two producers said they had plenty of it. There were several complaints of too high freight rates and one producer was specific and said that the rates he had to pay were 40% too high.

Indiana contains one large city, Indianapolis, where a fairly large proportion of the industry is concentrated. From the incomplete reports received from this section it is

plant storages for excess pea gravel and sand helps stabilize the price.

ILLINOIS. Illinois producers were practically unanimous in saying two things, that there were more plants than were needed and that the price was far too low for profitable business. At the same time most of the producers said they did the same amount of business as last year and about a third reported increases in business, some of them very substantial increases.

The prospects for 1928 are considered to be for about the same business as in 1927.

There is not much wayside pit competition in Illinois as would naturally be the case where competition among regular producers is so keen and where prices are so low. But one producer said 90% of the material in his market came from wayside pits and temporary plants.

There were a few complaints of too high freight rates and some producers enlarged on this and said that rates were much too high for the amount of business done and the price received.

The lower part of Illinois is in that part of the country seriously affected by the floods of the past two years. In this part of the state the sand and gravel business was naturally bad and the producers do not see many encouraging signs of better business in 1928.

Illinois contains Chicago, one of the largest markets for sand and gravel, but the



The J. E. Carroll plant at Franklinville, N. Y., which was improved and added to in 1927

VIRGINIA. The production in Virginia was the same or possibly a little less than in 1927. Prices were about the same, and are considered fair.

Plants in Virginia are about right to take care of the production, according to one of the largest producers. He calls attention to the fact that in periods of strong demand they are rushed to keep up with production.

Prospects for 1928 are for a continuance of 1927 business at the same prices.

There is no wayside pit competition in Virginia to affect regular producers seriously. There is some complaint of unfair freight rates. Consumers are demanding a better class of material and the plants are giving it to them.

WEST VIRGINIA. West Virginia produces and sells a lot of sand and gravel from the Ohio river, which is sold in the industrial region on both sides of the stream. Business in this part of the state appears to have been better this year than last. In other parts production was the same or a little less. The product appears to have been sold at a satisfactory price, although one producer said that prices were too low.

There was a unanimous opinion that there were more plants in the state than were needed to supply the normal demand for sand and gravel.

The prospect for 1928 is that business will be the same and that the price will probably be a little better. There were no complaints of unfair freight rates, and none of competition from wayside pits.

KENTUCKY. The limited amount of information received from this state would show that there was some increase in production and that the price was considered fair. The prospects for 1928 are considered good and there are no complaints of unfair freight rates.

TENNESSEE. Tennessee production shows a considerable increase over that of 1927, estimated by one producer at 10% and by another at 25%. But prices are considered to be too low. The prospects for 1928 are for the same or possibly a little better business and a somewhat better price.

Tennessee has not too many plants, when the increased demand of certain parts of the season is taken into account.

Freight rates were considered fair by every producer reporting.

The general tendency of consumers is to demand a higher class of material.

GEORGIA. Georgia's production is practically all sand, the only gravel production being on the border of the state and limited in amount. The limited information received from the principal sand producing district indicates that business has been about the same, both as to production and price, but the price is considered low. One producer estimates that there is 50% more plant capacity than is needed to supply the demand. Freight rates were considered unfair by one producer. The tendency was for the market to call for better material.

ALABAMA. The largest production in this state is from the Montgomery district, and the producers from this district reported that its production was less. One producer thought that 25% less material had been sold from this district than in 1927, while another placed it at 10%. Plant capacity and production appear to be pretty well balanced for a normal year. Prices are considered a little low.

The prospects for 1928 are for more business at the same price.

There is little or no competition in Alabama from wayside pits.

MISSISSIPPI. Mississippi production was affected by the floods of the past spring and some large plants were put out of business altogether for several weeks. When they could start production some of these plants filled no orders for material for general construction, producing only ballast for the railroads, which had need of all they could supply. But the demand for ballast was not enough to make up for the loss of other business.

Elsewhere than along the river production was increased. Prices are considered fair and there are not too many plants to supply the normal demand. There were no complaints of unfair freight rates and customers demand better material.

FLORIDA. Florida has largely imported its aggregates in past years but it is developing what resources it has, and the product is finding a larger market in the state. During a recent visit to Florida it was learned that the comparatively few sand and gravel plants of the state were producing steadily and selling the material at a fair price. The

state's production will probably be the same in 1927 as in 1926.

Trans-Mississippi

Reports from this area come from producers in Minnesota, Iowa, Missouri, Kansas, Nebraska and Oklahoma. Business throughout this area was very spotty, in parts extremely bad and in other parts good with a gratifying increase in tonnage at a fair price.

This is one of the areas from which the complaint of too many plants has come. But an examination of the questionnaires shows that this condition is confined to a small part of this area.

NORTH DAKOTA. Only one producer reported and he said that there had been a decreased business, but that prices were fair. The plant situation is all right and there are no complaints of unfair freight rates.

MINNESOTA. Minnesota producers reported both increases and decreases, and it is judged from the estimates given that the production of the state as a whole was about the same. All producers said they considered the price to be too low to admit of a reasonable profit.

Apparently the plant capacity of the state is not excessive, for only one producer said that he thought there were more plants than were needed to supply the normal demand.

Prospects for 1928 were considered to be for about the same or possibly a little less business than in 1927. Over half of the producers said that there was some wayside pit competition, two of them reporting it to be very strong in their territory.

Only one producer thought freight rates were unfair and he made the statement with some qualifications. Consumers in the state are demanding better material, and this applies especially to materials for highway work.

IOWA. The sand and gravel business in Iowa appears to have improved in 1927, for only one producer reported a decreased production, which was not the case in 1926. The price situation, too, seems to be satisfactory.

Estimates of increased production ran from 6% to 25%, the majority agreeing that it was around 10%. It is expected by a majority of the producers that business will be better in 1928 and with a better price.

Competition from wayside pits and casual producers did not affect Iowa producers much. All who reported said that they had to meet little or none of it. Freight rates were considered fair. There was not much disposition to demand better materials, as most of the plants turn out a product that will pass highway specifications.

MISSOURI. Missouri producers must have had a bad year, taking the state as a whole, as none of them reported increased production and some of them said that their output was much less than in 1926. The price was considered too low by all of them, one producer saying it was 10% too low, while others said in a general way that it was too low for any profit.

With only one exception, producers were agreed that there were too many plants in the state. A number of them enlarged on this point and some gave figures of 40% and 80% excess plant capacity. None of them were optimistic about the future.

There were some complaints that freight rates were too high, as compared with rates on other commodities, but none thought rates were unfair.

In the main, consumers were said to be demanding better materials, but in one of the largest producing districts quality was said to be of less importance than price.

Missouri contains two important metropolitan areas, around St. Louis and around Kansas City. Production in the St. Louis district was about the same or a little more than in 1926. In the Kansas City district it was much less.

KANSAS. Only a few Kansas producers gave estimates of production but these included some of the largest producers in the state. From their estimates it is judged that the state's production was very nearly the same as in 1927.

Without exception, every producer reporting said that he considered the price to be fair.

Kansas is one of the states of which it has been said that it had too many plants for the market, but only one producer who answered questionnaires said this was true.

It was judged that business would be the same or a little better in 1928, and that the price would probably be a little better.

There was only one complaint of freight rates being unfair, and this applied to a specific case. Without exception the producers said that the demand was for better materials, especially for highway work.

NEBRASKA. While more producers in Nebraska reported increases than decreases in production, it is judged that the total tonnage of the state will show a slight decrease. Building in the Omaha district, which is the most important area of the state, was at a rather low point in 1927.

Prices were generally considered fair and it is the general opinion that the plant capacity of the state is not more than is needed to supply the peaks that come in the height of the shipping season.

Producers look for a better season in 1928, with prices remaining the same as they are now. Freight rates are considered to be fair and there is not much competition from wayside pits.

OKLAHOMA. Oklahoma on the whole appears to have increased its sand and gravel production, although in the region around Tulsa there was probably a decrease. About as many producers said that they considered the price to be fair as those who considered it too low.

There was almost perfect unanimity in saying that the state had too many plants for the normal demand and producers were more specific and emphatic in saying this than they were in other states.

Two of them estimated the excess plant capacity at 50%, another at 60% and another at 66%.

It was estimated by a majority of producers that business would be better in 1928

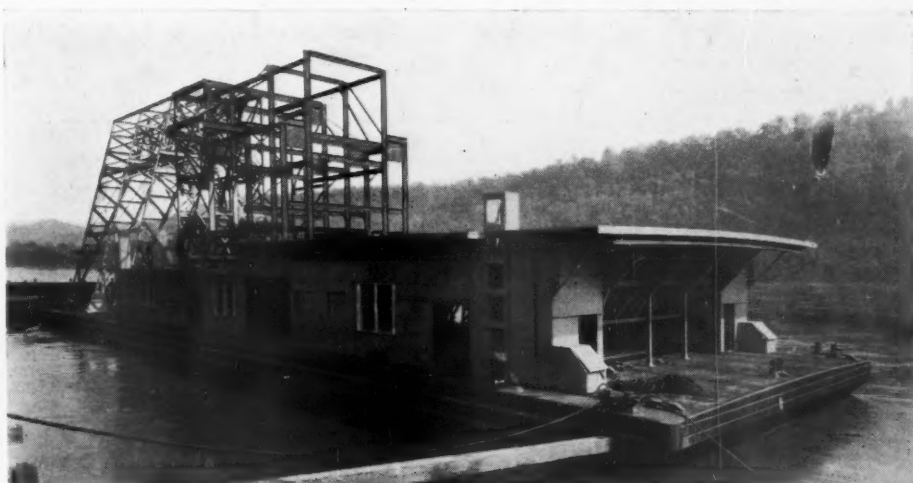
Only limited information was sent in, and this was to the effect that production was much less, with poor prospects for 1928, both as to volume of business and price.

TEXAS. Texas producers had a good year. Only one producer said that he had a decreased production and the others reported increases around 10%. The price, too, was generally considered satisfactory.

Opinions as to excess plant capacity varied according to the district from which the report was received, but taking the state as a whole it does not appear that there are more plants than are needed.

More business and a better price is looked for next year. No producer wrote that he thought there would be a decrease in either price or volume of business and about half the producers expected better.

There is a great deal of "pit run" production by regular producers in Texas. Under such circumstances it is not surpris-



New dredge of E. T. Slider, New Albany, Ind., shown at launching

and that prices would remain the same. There is some difficulty from wayside pit and casual production, though not so much as in other nearby states.

Freight rates were generally considered fair, although one producer gave an example of a rate which seemed to him to be quite unfair. All producers said that the market demanded better materials. The inspection on highway materials is said to be growing very rigid.

Gulf Coast and Southwest

Producers from this district sent in reports from Louisiana, Texas and Arkansas.

In Louisiana conditions have been very bad on account of floods. In other parts the sand and gravel business is judged to have been very good. Prices are considered fair, there are not too many plants and there is no complaint about unfair freight rates, although rates are considered to be too high.

LOUISIANA. Producers in this state were probably hurt by the floods of last spring more than those of any other state.

ing that wayside pit competition is practically nothing.

Unfair freight rates were not complained of so much as too high freight rates (as compared with other commodities).

With only one exception, producers said that better materials were being demanded.

ARKANSAS. All producers reporting from Arkansas said that production had increased, estimates running from 6% to 20%. Prices were generally considered fair, although one producer thought them too low. There are not too many plants in the state to supply the normal demand.

Little Rock, the principal city of Arkansas, was put out of business by the flood for a short time, although the actual damage to the city itself was small. However, it interfered with aggregate production seriously, although the market appears to have improved greatly after the flood.

It is expected that business will improve in 1928 with prices the same or a little better. Freight rates are considered too high. There is a decided tendency for consumers to demand better materials.

Rocky Mountain States and the Pacific Coast

In this great area sand and gravel production is small except in the Pacific Coast states, in which there are some of the largest producing companies in the United States. Unfortunately, the situation along the coast has been bad in 1927 with local price wars and a general disorganization of business in two states.

MONTANA. Two Montana producers reported some increase in production. One of them thought the price fair and the other said it was too low. Both thought there were more plants than were needed in the state and both said wayside pit competition was excessive. There is some complaint of unfair freight rates and consumers are not demanding better materials.

WYOMING. Only one producer reported and he said that his production was largely increased and that he was building another plant to care for an increasing demand. Better materials are wanted than formerly.

WASHINGTON. The decline in the lumber business is given by one producer much plant capacity for anything like a normal reason for no increase in the output in this state. Prices are considered to be too low to make a profit. There is too small market, one producer placing it at 75% excess.

Prospects are for less business in 1928 rather than for more and the price will probably not be improved. There were no complaints of too high or unfair freight rates, but it must be remembered in connection with this that a large part of the state's production is shipped by water. Consumers are demanding better materials and most producers are complying with the demand. But there is still a production of pit material, estimated to be 25% of all that is used in the principal district of the state.

OREGON. Especial interest attaches itself to the reports from Oregon this year on account of the state royalty situation. This has had a very serious effect on production. The matter is still unsettled but it appears from the latest newspaper reports that many producers will have to pay back royalties and such heavy current royalties as will seriously cripple the industry.

The price situation is said to be bad in one of the principal producing districts. There are too many plants, in the producers' opinions. There is not much competition from wayside pit material as most of the sand and gravel sold in the state has to be taken from the rivers by expensive dredging.

The tendency of consumers is to seek well prepared materials.

CALIFORNIA. California is now numbered among the largest producers of sand and gravel, being fourth on the list with a production of 13,000,000 tons. About 10,-

000,000 is produced in three counties of southern California. Here the production held up well in 1927, but a price war that broke out in midsummer drove the price below the cost of production.

There is no doubt that California has too many plants, especially southern California, where a recent survey showed three times as many plants as are needed. And the city of Los Angeles wanted to start another in the early part of the year!

Producers generally think that conditions will be better in 1928 and that the price will be better.

Prices and Profits

The price is not out of the way much.—*Nebraska.*

* * *

We look for much better prices. People are tired of doing business for nothing.—*Michigan.*

* * *

Prices are too low, the result being to discourage the development of established plants.—*New York.*

* * *

Competitive conditions have never been any worse.—*Illinois.*

* * *

Prices cannot be changed to amount to much. They are placed now to allow a fair margin of profit in a well-operated plant.—*New Jersey.*

* * *

Too Many Plants?

There is the survival of the fittest in all businesses.—*Connecticut.*

* * *

No. Production of high quality material needs more plants.—*New York.*

* * *

I have two plants, but one has been idle the past two seasons.—*Pennsylvania.*

* * *

Fifty per cent of the present number of plants would produce a healthier state of business.—*Oklahoma.*

* * *

No; a safe reserve capacity is needed to supply any demand that may be made by consumers.—*Nebraska.*

* * *

There is production capacity in our territory for 30% to 40% more material than the demand requires.—*Massachusetts.*

* * *

Our plant is large enough to supply all of our section of the state within 100 miles. Four other producers in this section are fighting for the small tonnage at almost any price.—*Illinois.*

* * *

Wayside Pit and Other Competition

Getting less, due to specifications.—*Ohio.*

A flock of "new ones" are here and they seem inclined to stay over a night or two.—*Kansas.*

* * *

One concern follows every paving job, puts up temporary wayside pit plant and sells below our operating costs.—*Minnesota.*

* * *

There is a lot of unfair competition, such as comes from not weighing the material sold and charging the buyer for more than he gets.—*Pennsylvania.*

* * *

We will always have high powered machinery salesmen and with them will come the fly-by-nighters. However, they cause us very little trouble.—*Indiana.*

* * *

Freight Rates

Rates are satisfactory as a whole.—*Virginia.*

* * *

Rates are excessive and out of line with those on crushed stone produced within our district.—*Illinois.*

* * *

We are of the opinion that our industry has always been imposed upon in the matter of freight rates.—*Ohio.*

* * *

Rates to our main market are 100% to 135% higher than prewar. Increase in our prices f. o. b. cars, 20% to 30%.—*Alabama.*

* * *

We feel that some definite system of computing freight rates would be better than the present arbitrary method.—*Pennsylvania.*

* * *

Our complaint is that producers from a neighboring state can come into our territory at more favorable rates than we can go into theirs.—*Kansas.*

* * *

Better Materials Demanded?

Yes; for which we are thankful.—*Oregon.*

* * *

Yes, and want them for less money.—*Ohio.*

* * *

Yes; inspection is more rigid every day.—*Oklahoma.*

* * *

The demand for smaller sizes is increasing.—*Connecticut.*

* * *

We hope so, but state officers are getting so they will accept anything.—*New York.*

* * *

No; just sand and gravel, with the exception of the state highway department.—*Minnesota.*

* * *

Those who do not know about the quality of the material are not satisfactory customers.—*Indiana.*

Crushed Stone Producers Report Prosperous Year

Gain in Production Equal in All Sections—Price Considered Fair and Plants and Demand Are Well Balanced

TAKEN as a whole, the crushed stone industry enjoyed a good year, although the increase in tonnage probably was not more than 6% for the country. But comparatively few producers, of those who answered ROCK PRODUCTS' questionnaires, reported decreased outputs, and the gain seems to have been fairly equal throughout the United States.

A considerable majority of all producers (60%) said that they considered prices fair. If allowance is made for a certain number who, as in all businesses, consider prices unsatisfactory even in prosperous times, the industry as a whole appears to think that the price leaves a margin for profitable working.

Since the question of too many plants for the market had been raised in the sand and gravel industry, ROCK PRODUCTS thought it well to investigate this point in connection with the stone industry, in which conditions as regard uses and markets are somewhat similar. An actual count of the producers' answers showed that a few more of them thought that there were too many plants than otherwise, but many who said this modified the statement by saying "not too many plants for an unusual year," or something of the kind. No such situation as exists in the sand and gravel industry was developed. There is no state in which it can be said that there are more plants than are needed to supply the peaks of the market, if one excepts the plants that should never have been built. By this is meant those plants where the stone quarried is unsound, where the railway situation is bad and those too badly designed and built to permit economical operation. A few obsolete plants should also be included in the list.

There was a considerable number of complaints that freight rates are either too high or unfair, a much greater number than reported in 1926. This is thought to be due to the number of adjustments of individual rates that are being made at the present time causing temporary inequalities that will probably be equalized later. However a number of producers said that rates, while not discriminatory, were too high as compared with the rates on other commodities.

The competition from temporary plants and inferior materials is not so serious in the crushed stone industry as in the sand and gravel industry, although what affects one in that way must affect the other to a

certain extent. Competition from state-owned temporary plants was complained of in one Southwestern state. In other states it was recognized that wayside pit production hurt the entire market for highway materials, but in the Northeastern states and the Central states, in which there is the greatest concentration of crushed stone production, such competition is little more than an annoyance.

"Farmer" production of agstone is one form of this competition and it was reported to be decreasing.

A lowered production of steel hurt the market for flux stone, especially in the summer months. But some plants that had a lower flux stone production found a better market in aggregates and highway materials that partly compensated for it.

The feature of this year's questionnaires was the high proportion of the crushed stone production that went into highway construction. Assuming that the amount used in highway concrete was the same, or a little more, it would appear that the increased highway market came largely from surfacing old roads. There has been a great deal of such work going on in almost all parts of the country.

Research and Technical Development

Research in the uses of crushed stone and the finding of possible new uses for it has been carried on unremittably by the Bureau of Engineering of the National Crushed Stone Association during the past year. The results have been given to the industry and the public in general through the National Crushed Stone Association *Bulletin* and several brochures issued from time to time and distributed by members of the association. These have already been noted in ROCK PRODUCTS and many of them have been abstracted.

Outside of the association's work, the research carried on by the Bureau of Public Roads, Department of Commerce is perhaps as important as any to the industry. Some of this covered the important matter of production costs and was given wide circulation including reprinting in ROCK PRODUCTS.

It is generally conceded that the work of the National Crushed Stone Association has reached a point where a laboratory is necessary, and it is probable that one will be established in the coming year.

The New Plants of 1927

Three things especially characterize the crushed stone plants of 1927, the great increase in washing methods, the use of vibrating screens and the use of grizzlies of the "live-roll" type. This, however, only carries out the tendency to use such machines for screening, which was shown in some of the notable plants of 1926. Practically all the new plants have arranged to wash at least a part of the product and some of them wash it all. Vibrating screens and live roll grizzlies are used to the entire exclusion of revolving screens in at least four plants and one plant uses only live roll grizzlies for all separations. The increased production of washed stone has brought in machines originally designed for washing and classifying ore.

The plant which appears the most radical departure from what might be termed the standard flow sheet is that of the Dolomite Products Co., near Rochester, New York. It was designed by the president of the company, John Odenbach, who had already attracted considerable attention in the industry by being among the first to use trucks in his quarry instead of locomotives and quarry cars. The plant is very simple. It makes seven sizes, running from $\frac{3}{8}$ in. down to dust (screenings) to a size plus 3 in. and minus 4 in., and does it with a 42-in and a 16-in. gyratory crusher and seven live roll grizzlies. It was described in ROCK PRODUCTS, August 21.

Two new plants employ live roll grizzlies in combination with vibrating screens, the Mohawk Limestone Products Co.'s plant at Mohawk, N. Y., and the plant of Dolomite, Inc. (Cleveland, Ohio) at Maple Grove, Ohio. The former was described in ROCK PRODUCTS for November 12, the latter will be described in an early issue.

The Mohawk Limestone Products Co. was really built in 1926, but was brought to its present state in 1927. As originally built, the screening was done by long revolving screens, the typical "stone screen" that has been in use since the beginning of the crushed stone industry. A live roll grizzly was substituted for the scalping screen and vibrating screens for the sizing screens with a considerable gain in cleanliness of product and in output. It was designed by Ellis Soper of New York.

New Plants in Central States

The plant of Dolomite, Inc., at Maple



Plant of the Dubuque Stone Products Co., Dubuque, Iowa

Grove, Ohio, is one of the larger plants of the country as its capacity is 500 tons per hour. It is constructed with much more attention to detail than crushed stone plants usually are, having such refinements as pneumatic bin gates, electrically controlled, stop systems to prevent the overloading of any machine and an alarm to cut down the feed whenever the plant becomes overloaded in any part.

An entirely new feature in crushed stone practice is the use of a pivoted bucket carrier to both elevate and convey the stone in transit and this has been found to have numerous advantages.

Live roll grizzlies, one of them having 6-in. openings, are used for the coarser separations and vibrating screens for the finer separations. The arrangement of these is such that a large number of sizes is produced.

Ali stone below 2 in. in size is washed and the screenings are given a further wash and separated from the dust and finest material by a bowl classifier.

An interesting fact about this plant is that it was erected on the site of the old plant without seriously interrupting production. Only the primary crushing plant and the carrier were retained in their original positions and all the building and the bins were completely replaced.

This plant was designed by Walter Patnoe, the engineer of the company, with Samuel Eels, the president of the company. A most unusual amount of preliminary study was given to the plans so that the flow sheet is as completely "balanced" as would be possible.

In view of the demand for fine sizes, it is worth noting that the output of the plant is the same whether it is crushed to the usual 4-in. and finer sizes or all to 1½-in. and finer. The recrushing system, by which this is made possible, employs two

cone crushers and the method of feeding them is one of the most interesting features of the plant.

The new plant of the France Stone Co., at Monroe, Mich., is interesting because it embodies many years' experience of the second largest producer of crushed stone in the United States for a good many years. It employs revolving screens, vibrating screens and a special gyrating screen for washing the finer sizes. This plant does rather more washing than many plants that wash stone, as it uses 2,000 g.p.m. of water (plant capacity, washed and unwashed, 300 tons per hr.).

The design is rather more compact than in the other plants of this year. The screening plant, placed on the bins, has the scalping screen above and the sizing screens below it. The discharge of the primary conveyor is brought to the scalper by a pan conveyor and there is one elevator which elevates fines to vibrating screens. There are three crushers, a No. 21 primary and a No. 7½ and No. 8 for secondary crushing. A variable speed motor is used on the primary crusher.

The Ohio Blue Limestone Co. built a new primary crushing department at its plant near Marion, Ohio, and modernized its screening plant. The primary crusher is interesting because it is the first installation of "giant" rolls that has been made in several years. The reason for using this particular type of machine is that the deposit breaks into flat slabs which the rolls handle very well. In the screening plant perhaps the most interesting machine is a revolving grizzly which was designed and built at the plant. The quarry has been completely modernized, with new electric shovels and gasoline locomotives.

An excellent plant of 2,000 tons daily capacity was built this year by the Dubuque Stone Products Co., at Dubuque,

Iowa. It is interesting because it is a "city" plant, near a large number of residences, so that blasting has to be carefully done. The face is 200 ft. high, worked by the usual well drill and steam shovel methods and trucks convey the broken stone to the crusher.

The primary crusher is a 30-in. gyratory crusher and a No. 7½ and a No. 5 crusher are used for secondary crushing. There are two revolving screens and six vibrating screens. A description of this plant will be published in an early issue.

Southern Plants

There was unusual activity in the granite region that extends over a part of Virginia, the Carolinas and Georgia. Two of the plants built in this district are among the largest in the South, the Trego Stone Co.'s plant at Emporia, Va., and the Weston and Brooker plant at Cayce, near Columbia, S. C. The latter is of especial interest to the crushed stone industry, as it was designed and built by W. S. Weston, who is a well-known mechanical engineer and the inventor of the Weston crusher and some other machines which are used in screening and washing crushed stone.

The primary crusher is below the ground level so that the cableway pan dumps directly to it without too much elevating. It is a No. 27 gyratory. A No. 8 and a No. 5 are used as secondary crushers and Weston No. 36 crushers are used for final reduction. A gravity screen and a revolving scalping screen are used for primary separation. The final sizing is in a screen house placed over steel bins in which there is a revolving screen followed by two vibrating screens of Mr. Weston's design. They are used for washing as well as sizing and they are almost unique in that the screen runs submerged, something that many screen builders have attempted before without success.

So far the the screening and washing arrangements are concerned, it would be difficult to design a simpler and more efficient arrangement. The crushing plant will appear to have an excessive capacity for the daily output, 2,000 tons, if one knows only limestone crushing practice, but the need for so great a capacity is explained by the

that the actual requirement is somewhat less.

An old plant that has been so fully rebuilt that it is practically a new plant, is that of the Carolina Road Granite Co., between Wilson and Rocky Mount, N. C. This operation is interesting, for the unique method by which the stone gets from the

ramp with a 4% grade extending over a part of the excavation. The output is sold to a regular crushed stone producing company and it is said that part of it will go back in the hole as concrete. It was described in the November 26 issue.

An unusual amount of washing is given the trap rock quarried by the Quinn Stone and Ore Co., Fort William, Ontario. The quarry is full of fine seams of clay and making it into a clean crushed stone was something of a problem. It was solved by using a washer developed in the iron ore region which is not far from this locality. A brief account of the operation was given in *Rock Products* for March 5, 1927.

Notes of Other Operations

The United Electric Limestone Co., which is a subsidiary of the United Electric Coal Co., purchased the crushed stone operation of the East St. Louis Stone Co. A modern plant for approximately 75 cars per day output is now in the course of construction.

The Red River Crushed Stone Co. took over the quarry at Stacey, Ark., and is now producing Red River trap rock. C. A. Morris is president. The main office of the company is in Little Rock.

This list, while by no means complete, is typical of the trend of development in the industry.

NEW YORK. The state highway department was reported in May to have taken a long lease on the quarry at Kingston from which it has been taking material for repairing roads.

PENNSYLVANIA. The Donaghmore Coal and Stone Co., Lebanon, Penn., bought the Limestone Products plant and quarry.

OHIO. The Centerville Limestone Co. made extensive improvements to its plant at Centerville, Ohio.

The properties of the Casparis Ohio Quarries Co., one of the oldest and best known companies in the state, were sold at a receiver's sale for \$23,000, in the latter part of the year.

An important combination of crushed stone companies, bearing the name of the National Lime and Stone Co. was formed from the National Lime and Stone Co. of Carey, the National Quarries Co., Carey, and the Bluffton-Lewisberg Stone Co., of Findlay. Headquarters are at Findlay.

Dolomite Inc., of Cleveland, acquired the Leatham D. Smith quarry and plant at Sturgeon Bay, Wis. in the latter part of the year and are remodeling the plant and making other improvements. The operation will be known as the Sturgeon Bay Co., and it will produce at least 1,000,000 tons yearly.

The France Stone Co. bought the quarry of the Consumers Lime Co. at Tiffin, Ohio.

ILLINOIS. The Brownell Improvement Co. built a very large storage and handling plant in the southern part of Chicago.

The Columbia Quarry Co. of St. Louis, Mo. made many improvements in its plants



New plant of the Ocala-Tampa Limestone Co., Ocala, Fla.

fact that the material crushed is hard granite. Especial attention had to be paid to replacement of wearing parts in this plant, so that delays from replacement would not be serious, and manganese steel and other hard alloys are used wherever needed. A chain bucket elevator with a manganese steel chain, with chrome steel pins, is an illustration. It was built to special order from Mr. Weston's drawings. The plant was described in *Rock Products*, May 28, 1927.

The Trego Stone Co.'s plant is one of the enterprises of W. W. Boxley and his associates, who operate a number of plants, most of them crushing limestone. It is peculiar in that it was put up at the request of railroads which needed ballast and other material, and railroads take all the output, fine and coarse, amounting to 2500 tons per day.

The rock in the granite belt varies decidedly, running from coarsely crystalline to fine grained and from soft to very hard. The hard granite quarries and crushes well where it has a gneissoidal structure, and a deposit of this kind was located after some months of prospecting. For this reason the plant does not vary so much from the plants crushing the hard limestones of some northern states.

It was designed by Allis-Chalmers engineers and is of a type familiar to the industry, a primary crushing house, a secondary crushing house and a screening house over the bins, connected by inclined conveyors. The primary is a 48x60-in. jaw crusher, the secondary a 20-in. gyratory and the final reduction is by two 10-in. gyratories placed in the screening house. Much fine crushing is not wanted for the greater part of the output is railroad ballast. A list of the motors and their rating totals to about 700 hp., but it is surmised

quarry to the primary crusher. It is brought from the shovel in trucks which are dumped into a pan that is elevated by a derrick to the primary crusher hopper. It looks a complicated method, but the owners of the quarry, who have spent all their lives in the crushed stone business, adopted it after carefully estimating the cost of several different methods of transportation.

The primary crusher, which is new, is a 48x60-in. jaw crusher. The secondary is a 16-in. gyratory, originally the primary crusher of the quarry, and there is a 10-in. gyratory with two No. 5 gyratories for re-crushing.

The power plant of this operation is one of the largest in the industry, employing Diesel engines. There are five of these, giving a total output of 910 hp. All are connected to generators, the crushing and screening machinery being fully motorized.

In Florida the Crystal River Rock Co. built what is practically a new plant which has a capacity for 4,000 yd. per day. It is at Leesburg, crushing the limestone of that locality, principally for road material. Single roll crushers are used for primary and secondary crushers. It was designed by J. M. Johnson of the Allis-Chalmers Company and G. L. Abbott, the plant superintendent. It was described in the May 28, 1927, issue.

A plant that has attracted considerable notice from the public outside of the industry is that of Foley Bros., Inc., at Fort Lee, N. J. It is crushing trap rock that comes from the excavation that is being made for one of the anchorages of the new bridge that will span the Hudson, connecting New York City with New Jersey. To the stone man perhaps the most interesting feature of the operation is the transportation. This is by trucks which bring in the rock from the quarry over a broad wooden

across the river in Illinois. Mining has taken the place of open quarrying at the Valmeyer operation.

MICHIGAN. The Michigan Limestone and Chemical Co. of Rogers City, with a production said to be about 12,000,000 tons per year put in service large sea-going vessels for delivering stone at lake ports. The boats are owned and operated by the Bradley Transportation Co.

WISCONSIN. Wisconsin Granite Co., which operates 14 quarries in Wisconsin and South Dakota largely increased production and reopened quarries.

NORTH CAROLINA. It was recently reported that a limestone deposit near Kinston will be opened and an agricultural limestone plant built.

GEORGIA. A granite quarry was opened and a plant installed at Elberton, Ga. Both crushed stone and paving blocks are to be made.

ALABAMA. The Rockwood - Alabama Stone Co., one of the oldest and largest quarries in the state, was just recently been reported to have been taken over by the George A. Fuller Co., of New York. The consideration is said to be \$450,000.

FLORIDA. The Ocala-Tampa Limestone Co., Ocala, built a new plant for crushing Ocala limestone to highway material.

OKLAHOMA. The Zenith Stone Co., Tulsa, Okla., was recently sold to E. J. and C. H. Krause of St. Louis, Mo. A number of improvements are being made in both quarry and crushing plant.

The Monarch plant near Tulsa, Oklahoma, completed the crushing plant which it began last year.

The crushing plant of the Bromide Crushed Rock Co., Bromide, Okla., was badly damaged by fire early in the year.

CALIFORNIA. The Orange County Rock Co. was reorganized and began operating under the name of the Imperial Valley Rock Co. at Frink, Calif.

IDAHO. The Idaho Marble Co., which produces marble chips for aggregate and sells them in several states was reorganized as the Oregon-Washington Lime Products Co. The output of the plant was increased to 200 tons per day.

MISSOURI. Nine rock crushing companies of western Missouri and eastern Kansas united to form the Consumers Material Co. They were: American Rock Crusher Co., Atlas Crushed Rock Co., Consolidated Crushed Stone Corp., Kansas City Quarries Co., W. M. Spencer Co., Clay County Crushed Rock Co., W. A. Ross Construction Co.'s quarry interest, Thomson Bros. Rock Co. and Twymen Crushed Rock Co.

Report of Production and Conditions by States

Northeastern States

This area contains a large proportion of the crushed stone plants of the United

States and from the answers to questionnaires, it is judged that the district as a whole did a very satisfactory amount of business. Even in New England, where some other branches of the rock products industry were not so prosperous, the crushed stone business seems to have done very well.

A gratifying feature of the report from this district is that producers are practically united in agreeing that the price received was fair, even though the profits were less than were sometimes warranted by the hazards of the business.

There are plants enough to supply the normal demand of this area, but there is no great excess of plant capacity in any part of it, apparently.

VERMONT. A limited amount of information from Vermont was that the states production was somewhat less on account of floods and the price low. But a 25% increase is hoped for in 1928, at the same price.

MASSACHUSETTS. Although the amount of new construction in Massachusetts in 1927 was not large, producers' reports show more increases than decreases, and it is judged the state's production as a whole will show an increase. One producer said that his output was twice as much in 1927 as in 1926. The price was considered fair by everyone who answered questionnaires. And only one producer thought that there were more plants than were needed.

As many producers expressed the opinion that business would be better in 1928, as those who thought it would be the same

There was the same unanimity in judging the price to be fair, except that one producer noted that profits were less than they formerly were as the costs of production tended to increase. He thought labor was paid too much.

A few producers thought that there were more plants than were really needed to supply the normal market, but a majority considered production and demand to be well balanced.

Regarding prospects for business in 1928, no producer said he thought there would be less business, but more thought it would remain at its present level than those who thought it would be increased. Every producer judged that the price would remain as it is now in 1928.

No producer complained of unfair freight rates, but one thought rates too high as compared with commodity prices. With few exceptions those who reported said that their customers demanded better materials.

NEW YORK. Four-fifths of the New York producers reported increased production, the others reporting decreases. Only one large increase was noted, the others being for increases of 4% to 6%. Possibly a 5% increase may be taken for the state as a whole.

Only one producer thought the price to be too low. Some others said they considered the price fair, although it left them only a small margin for profit.

In general, producers seemed to think that plant capacity was no more than was needed to supply the peaks of the market,



Primary crushing department and conveyor of the rebuilt plant of Ohio Blue Limestone Co.

or less. It is thought that the price would remain the same as in 1927.

There were practically no complaints of unfair freight rates, and the producers were united in saying that their customers were demanding better materials.

CONNECTICUT. Without exception, the Connecticut producers who reported said that there had been an increased tonnage sold in their territories. The estimates ran from 4% to 12% and the greater number estimated 10%, which is taken to be the increase for the state as a whole.

although one producer judged plant capacity in his district to be 25% in excess and two others said there was some excess but not very much.

New York producers were more optimistic than some others in predicting the demand for stone in 1928, most of them looking for increased business. But more of them thought the price would be less than the 1927 price.

There were a few complaints of unfair freight rates. Almost without exception producers said that they had no competition

that they considered unfair, the competition being between stone and other well prepared materials. Almost all other producers said that better materials were wanted, and one said the consumers wanted harder, better graded and cleaner stone than they did in former years.

The reports received covered practically all parts of the state.

NEW JERSEY. The crushed stone industry in New Jersey must be in a very satisfactory condition, for every company reporting said that it had done increased business in 1927 over 1926. All considered the price received to be at least fair. The estimates of increased production ran from 10% to 20%, with one exception.

All the producers but two said they thought plant capacity and production were well balanced. The others said no more than that they thought plant capacity to be somewhat in excess of what was needed.

Little or no competition from "fly-by-night" producers or producers of poorly prepared materials was noted. There were not many complaints that freight rates were too high and almost all producers thought better materials were demanded.

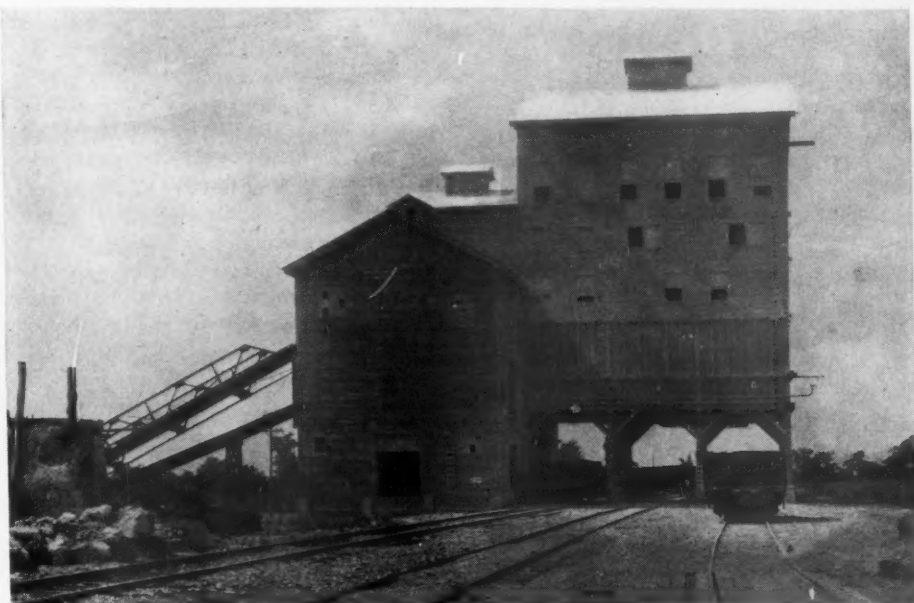
PENNSYLVANIA. Pennsylvania producers answered questionnaires in a very gratifying way, more being received from this state than from any other northeastern state. One-fourth of them said that production had decreased in their territories, but the other three-fourths reported increases running from 3% from 12%. Although the increases reported were large, running from 20% to 40%, it is not judged that the production of the state as a whole has substantially increased.

supply the normal market. One producer said the excess was 50%, two others, 25%, and one, 20%. The others said merely that they considered that there was some excess, without specifying how much.

Almost all the producers looked for a continuance of the same business as in 1927 in 1928 or better. Three thought it would

ceived from Delaware was to the effect that production had decreased slightly and that it was sold at a lower price.

MARYLAND. More Maryland producers reported increase of production than reported a decrease. They were equally divided concerning the price, half of them saying it was fair, the other half think-



The steel truss bridge from the quarry is an interesting feature of the Hagersville plant of the Canada Crushed Stone Corp., Ltd.

be very much better as they were preparing for increases of 25% to 35%. One other judged it would be 15% better. The almost unanimous opinion was that the price would remain the same.

There was more complaint than in other

ing it too low. Their opinions were divided in the same way about excess plant capacity.

Almost all of them judged business would be better in 1928, one saying that he thought it would be 25% better. But the greater part of them looked for the price to be lower or the same in 1928.

Apparently there is not much competition from unfit materials as only one producer said that he was seriously affected by it. No producer had any complaint to make of unfair freight rates. All but one said that the market did not demand better materials than it was getting.

Central States

In this group of states answers to questionnaires cover the states of Ohio, Indiana, Illinois and Wisconsin very thoroughly. All of these states but Michigan appear to have considerably increased production in 1927, and Michigan may have done so. The price throughout the whole area was generally considered to be fair. The plant situation appears to be satisfactory, although a fair proportion of the producers thought there were too many plants for the present demand. Generally, better business is looked for in 1928, at the same price. There were few complaints of unfair or too high freight rates and in every state there was a strong demands for better materials.

This area is a very large producer of crushed stone. In addition to the usual number of moderate tonnage operations, it con-



Plant, built in 1927, and quarry of Canada Crushed Stone Corp., Ltd., at Hagersville, Ont.

A few producers considered the price received to be too low, one said 10% too low, but by far the greater number said that they considered the price to be fair, with a small margin for profit.

A few more than half those who expressed an opinion thought that there was more plant capacity than was needed to

states of the competition of poorly prepared materials, several producers saying that they had to meet a lot of it. About a third of the producers thought freight rates to be unfair or too high, and a majority of them said that better materials were being demanded.

DELAWARE. Limited information re-

tains one which turns out about 10% of the entire production of the United States and several others which rate among the highest producers of the greatest tonnages.

Gravel competition is very strong in this area and in some parts of it there is a considerable competition from crushed slag.

OHIO. Ohio producers were very good about answering questionnaires, so that the state of the industry can be well determined. By far the larger number of them, including the producers of the greatest tonnages, reported increased production, and it is judged that the production of the state as a whole will show a 10% increase.

Very few producers had any fault to find with the price. One thought it 15% too low and another 20% too low, but a consensus of opinion would seem to be that the price is enough to provide some margin for profit.

A large proportion (80%) said that they thought there were more plants than the normal market needs. One producer estimated the excess plant capacity at 15%, another at 20% and a third at 25%.

Almost without exception, Ohio producers look for a better year, or at least as good a year in 1928 as in 1927. Estimates of 15%, 17% and 50% increases were made. It was judged by almost all that the price would remain the same.

There is comparatively little wayside pit competition in the state, although one producer said he had to meet plenty of it.

A few producers complained of freight rates, but except in one or two instances the complaint was that they were too high rather than unfair. There was an almost unanimous opinion that customers were demanding better materials.

INDIANA. All Indiana producers but one, who said his production was the same, said that they had increases of production running from 10% to 20%. There was only one who did not think the price satisfactory and he thought the price was much too low.

The plant situation is apparently satisfactory in Indiana, as only two producers said unqualifiedly that there was more plant capacity than the market needed.

Only one producer thought there would be less business in 1928; most of the others thought it would be the same or a little better. One thought 20% better. It was judged that the price would remain the same.

There were no complaints of unfair freight rates although one producer thought that they were too high. Almost all said that customers were demanding better materials.

ILLINOIS. While the situation in Illinois does not seem to have been as satisfactory as in some others of the Central States, it is judged that the state's production was as much in 1927 as in 1926 and sold at about the same price. But a large proportion of the producers said that they

considered the price too low for profitable working.

Seventy per cent of the producers thought there was more plant capacity than the state needed. Only one gave an estimate and he thought there was 33% excess capacity. One producer reported recently that one plant running half time could supply the needs of his immediate territory, so there may be considerable excess plant capacity in some districts.

Producers were not optimistic in predicting business conditions for 1928. None of them thought there would be more business and three of them thought business would be less by 10%, 20% and 25%. It was thought that the price would be the same or a little better.

There were few complaints of unfair freight rates, but several producers thought rates were too high. One noted that trucks were taking the short haul business in his territory. Two-thirds of the producers said that customers were demanding better materials.

MICHIGAN. So few Michigan producers answered questionnaires that the state's production as a whole cannot be determined. Both increases and decreases were reported and one balanced the other. One large new plant went into production in the latter part of the year.

All of the producers thought the present price was fair and one judged there was an excess of plant capacity. All looked for better business in 1928 at the same price. There was no complaint of high or unfair freight rates.

WISCONSIN. All but two Wisconsin producers reported an increased production; one of these said his was 33% less, but this was more than balanced by another's increase of 40%. Most of the increases reported were around 5%. More thought the present prices to be too low than thought them to be satisfactory.

The prospects for 1928 were almost unanimously thought to be for a continuance of the same business in 1928. One dissenter thought it would be 10% better and another that it would be 20% worse. All but one thought present prices would continue.

Wisconsin is notoriously a state in which there is competition from wayside pits. More than half the producers said they had to meet it and one said there was very much of it in his territory. There was only one complaint of unfair freight rates, the others finding them neither unfair nor too high. About two-thirds said that customers were demanding better materials.

South and Southeast

In this area fairly complete information was received from Virginia, West Virginia, Kentucky, Tennessee, North Carolina and South Carolina. Georgia, Alabama and Mississippi have small productions of

crushed stone. Florida has a considerable crushed stone industry, but the information from this state is incomplete.

North and South Carolina and parts of Virginia and Georgia are on the granite belt of the lower Appalachians and crushed granite is produced in large quantity, especially for highway materials and railroad ballast. Throughout the remainder of this district the stone crushed is limestone. In Florida a great deal of soft limestone is crushed to make a special type of road.

Production in the Southeastern States has increased and there is little complaint of prices being too low. The general impression seems to be that there are more plants than are needed to supply the needs of the market. In some parts the excess capacity is insisted upon more than others, specifically Tennessee and Florida.

There is strong competition with gravel in the coastal plain area of this section and a great deal of competition from crushed slag in the Gulf Coast States.

VIRGINIA. All Virginia producers but one reported increases and all but one said that they considered the price to be fair. Two of them said they thought that less plants would supply the market, one of them estimating the excess plant capacity at 25%. It is judged that the state as a whole will show about a 10% increase.

Regarding prospects for 1928, all considered that business would be the same or better and two gave estimates for 20% and 30% increases. It was judged by all but one that the price would be the same or a little better.

Practically no competition from badly prepared materials was noted. There were no complaints of unfair freight rates, although one producer said he thought rates were too high. Without exception, every producer said the market demanded better materials.

WEST VIRGINIA. Reports from West Virginia were not as complete as they were from some other states, but two-thirds of those reporting said they had had an increased output. The price was considered too low, one producer estimating that it was 10% too low.

More producers thought there were too many plants than otherwise, one estimating the excess capacity to be 25%.

Prospects are for the same or a little less output in 1928. The price, it is judged, will be the same or a little higher.

A little competition from poorly prepared materials was noted. There was no complaint of unfair or too high freight rates and there was a unanimous opinion that better materials were demanded.

KENTUCKY. All Kentucky producers reported increases, the estimates running from 5% to 25%. The average is about 10%, which will probably represent the increase of the state as a whole. Almost all of them said that the price was fair. They

were about equally divided as to whether or not there was more plant capacity than was needed. One said that he judged the excess capacity to be 40%. The others gave no estimates, but one producer pointed out that the plants in his district had to be run only half the time to keep the market supplied. Another said that while there seemed to be plants enough there were times when the demands could not be promptly supplied.

Most of the producers are looking for better business in 1928 at the same price.

Considerable competition from poorly prepared material was noted. Half the producers complained of the freight rates, the most of them saying they were too high. One said they were discriminating. About half the producers thought that customers were demanding better materials.

TENNESSEE. Tennessee producers did not find business so good as did those in other parts of the South, for all but one reported the same or a decreased production. But about half of them considered the price to be fair for a normal output.

Almost without exception they said that there were more plants than were needed to supply the market. One or two said this quite emphatically. However, they were all optimistic in predicting for 1928, expecting the same or better business at the same or a little lower price.

There was more than the usual complaint against the competition of badly prepared and unfit materials, but in such competition one producer included the plants that crush marble spalls and waste from the Knoxville quarries, generally held to be legitimate producers.

There were two complaints of freight rates being too high or discriminatory. Most of the producers thought the market was demanding better materials.

NORTH CAROLINA. North Carolina's production apparently was increased over that of 1926, as any decrease reported was more than balanced by increases from larger producers. The price was generally held to be too low for profitable working.

Every producer said that there were too many plants in the state. The plant situation is somewhat unusual in North Carolina as there have been many small crushing plants put up in a temporary way to supply the demand for highway materials in what were then out of the way places. Some of these have been operated by regular producing companies. But little or no competition from poorly prepared materials was noted.

In predicting business for 1928, more thought it would be less than thought it would be more. One estimated a decrease of 25%. It was thought that the price would be lower.

Some of the producers thought that freight rates were too high or unfair, but all were agreed that the market is demanding better materials.

SOUTH CAROLINA. Not many producers reported from South Carolina. Those who did reported an increase, but their opinion was divided as to whether the price was fair or not. There was the same division of opinion as to whether or not there was too much plant capacity.

It was thought that business would be better next year than this and that prices would remain the same.

Little competition from poorly prepared or unfit materials was noted. In general, freight rates were thought either too high or unfair. It was agreed that customers wanted better materials.

GEORGIA. A limited amount of information received from Georgia said that production had decreased about 6%. The price was considered too low. No better conditions were looked for in 1928.

FLORIDA. A very limited amount of information from Florida would indicate a 20% decrease in production at a lower price. It was thought that business would decrease in 1928, but that the price would be better. There is some competition from poorly prepared materials.

Trans-Mississippi States

The states across the Mississippi are largely prairie states in which gravel is abundant only in certain small areas and some of the larger rivers. Crushed stone, largely from limestones of the carboniferous age, is the principal coarse aggregate. Throughout the whole area almost all producers reported increased production and in some parts, where highway work was especially active, the increases were very large. Generally, producers found prices too low for a fair profit.

In all parts producers are looking for an increased business in 1928 and it is thought that the same or better prices will prevail.

There were rather less complaints of way-side pit and "casual" competition. Such competition in this area principally affects the producers of sand and not those producing coarse aggregate. There were relatively few complaints of unfair or too high freight rates.

MINNESOTA. Good increases were reported from Minnesota producers, although one who has a large output reported a decrease. Prices were thought too low by a majority, and all were agreed that there were plants than the market needed.

Prospects for 1928 were for the same amount of business at the same or a little lower prices. Very little competition from poorly prepared or unfit material was reported.

All producers reporting said that they considered freight rates to be too high or unfair. Only one said that the market demanded better materials.

SOUTH DAKOTA. The principal crushed stone production in South Dakota

is in the red quartzite area, near Sioux Falls and Del Rapids. From this area it was reported that production had increased but that prices were considered too low. A better business was looked for in 1928 at the same price. There is a considerable competition from poorly prepared material, estimated at 40% by one producer. There was no complaint of unfair or too high freight rates and the market was said to want better materials.

IOWA. Iowa is carrying out an extensive road building program and the productions of all aggregates has increased accordingly. Apparently the stone business is getting its share, for all producers reported increases, and those who gave figures said that increases were from 20% to 100%. But the price received was considered too low by all but one producer.

None of those reporting considered that there were more plants than were needed to supply the demand.

As to 1928 more producers were looking for better business than looked for it to continue the same and most of them thought the price would be better.

Half the producers found fault with freight rates, but one of these qualified his remarks by saying that he hoped for adjustments. Almost all producers said that better materials were being demanded.

MISSOURI. Missouri's production was not so good, as a whole, although more producers showed increases than decreases. This was laid to the state's change of policy in building highways. In the western part of the state production was decidedly decreased. The price received was considered low. It is high as compared with prices in some other states, but the cost of production in Missouri is generally much higher than elsewhere.

Only one producer thought that there were more plants than were needed for the market.

Most producers looked for better business in 1928 and all of them thought that the price would remain the same. There were no complaints about freight rates. Most producers said their customers wanted better materials.

KANSAS. The production of crushed stone in Kansas this year showed some increase, although one producer reported a small decrease. The price was generally considered to be low. More producers thought there were too many plants for the market than thought production and market balanced.

All looked for the same or better business in 1928 with prices continuing at the same level. There were no complaints of unfair or too high freight rates. All agreed that the market was continually demanding better materials.

NEBRASKA. There is a relatively small production of crushed stone in Nebraska, and this year even this was badly cut. One

producer reported a 48% decrease. It was thought that there were too many plants for the market. There was no complaint about freight rates and better materials were in demand.

OKLAHOMA. In spite of Oklahoma's political troubles, which had a bad effect on the market for highway materials, Oklahoma crushed stone producers appear to have had a good year as all reported increases running from 6% to 10%. The price was not much commented upon, but one producer thought it was fair while another said it was 10% too low.

Two-thirds of the producers thought that there were no more plants than the market needed. One producer estimated that there was 50% excess plant capacity in his district.

All producers are looking for better business in 1928, one saying he thought it would be 20% better and another 50%.

There was no complaint of competition from poorly prepared material. Only one producer found fault with freight rates. All producers said that better materials were demanded.

Gulf Coast and Southwest

This area includes Louisiana, Texas, Arkansas, Arizona and New Mexico, but only producers in Texas and Arkansas answered questionnaires. There is only one crushed stone operation in Louisiana, and conditions in that state were very bad, owing to the floods of last spring which put a large part of the state under water. In both Texas and Arkansas, business appears to have been fair.

Limestone is crushed in the greater part of Texas but one of the largest producers works a trap rock inclusion near the center of the state. In Arkansas a considerable part of the production is crushed quartzite from the bluffs of the Arkansas river. The remainder is crushed limestone.

TEXAS. Texas producers mostly reported increases running from 6% to 25%. It is thought the increase for the state is about 6%. Without exception, every producer said that the present price was too low for a profit.

They were also agreed that the plant capacity is greater than is needed to supply the demand of the market.

As to prospects for 1928, all producers but one said they looked for an improvement in the amount of business done, one producer saying that he was preparing for a 10% increase and hoped it would be 25%. All were agreed that the price would remain the same, with the exception of one who thought it would be less.

There is a considerable amount of competition from casual production in Texas, estimated from "very little" to "a great deal." One producer said his worst competitors were the temporary plants that were set up beside highway jobs, and he thought they could run only because the inspection

of their product was less rigid than that given the product of established plants.

Almost without exception Texas producers said that they considered freight rates to be too high, although none of them said they considered rates to be unfair.

Every producer said that his customers demanded better prepared materials, although some of them noted that customers did not want to pay any more for the extra quality.

ARKANSAS. Arkansas was very meagerly reported and the largest producers in the state did not answer questionnaires. Those who did said that they had the same or lessened production but they considered that prices would be fair for a normal output. They looked for better business in 1928 at the same prices. One producer complained of unfair freight rates. Better materials were said to be demanded.

Arkansas suffered much from heavy rains and floods during the spring of 1927 and in some cases this is known to have materially affected the production of crushed stone.

Rocky Mountain and Pacific Coast States

There is very little crushed stone produced in this area. A great deal of crushed material is sold in California, but it is crushed boulders and classed as crushed gravel, following the practice in Illinois and New York where much gravel is crushed. Where actual crushed stone production is carried on the rock may be almost any hard stone as in most of the areas more igneous than sedimentary rocks are exposed. One large operation in California quarries granite and another serpentine.

COLORADO. Only two plants reported from Colorado, one of which said it had a 50% decrease in production, while the other reported a 6% increase. One considered the price to be fair for a normal market, the other said it was too low. Both were agreed that there were too many plants for the market. Neither found fault with freight rates and only one said there was a demand for better materials.

IDAHO. A single producer reporting from Idaho said that he had a gratifying increase in business and considered the price fair. He looked for business and price to be the same in 1928.

OREGON. Production was reported as the same as in 1926, except by one producer who said it was 15% less. All considered that prices were fair. A majority thought that there were more plants than were needed.

Better business was looked for, one producer estimating it would be 15% better. It was thought the price would be the same or less.

CANADA. The Canada Crushed Stone Corp., Ltd., built a new plant at Hagersville, Ont., completed in June of this year. It also purchased a quarry at Puslinch, Ont., and began the erection of a plant, December 1, which will be in operation in the spring.

Profitless Prosperity?

"New dollars for old dollars."—*California.*

* * *

Prices can't go any lower.—*Ohio.*

* * *

We are able to make a reasonable profit on present prices.—*Connecticut.*

* * *

Price could be a little higher, but we would prefer to do more business at the present prices.—*Wisconsin.*

* * *

Over-Planted?

No more plants needed on Pacific coast. Too many now.—*California.*

* * *

Our capacity is for at least 50% more than we can sell.—*Ohio.*

* * *

Ohio may be so, but as the quality of our product is superior we have not felt it.—*Oregon.*

* * *

There may be slightly too much plant capacity but not enough to be dangerous or very harmful.—*Pennsylvania.*

* * *

Nothing to it. Let them all have a share in the business. I know of contractors who couldn't get material.—*Illinois.*

* * *

Way-Side Pit Competition

None, but we have some fly-by-night financiers.—*Ohio.*

* * *

The small agstone pulverizers are dying out.—*Ohio.*

* * *

There is not so much fly-by-night as cut-throat competition.—*Michigan.*

* * *

Plenty of fly-by-night production. The fool crop is plentiful.—*Tennessee.*

* * *

Plenty. Contractors operating their own plants are the worst competitors.—*California.*

* * *

A great deal of unfair competition through short-weighting and poor grading.—*Pennsylvania.*

* * *

Roadside plants and state-owned plants are increasing and their competition is getting to be serious.—*Texas.*

* * *

Considerable gravel used for concrete work is very poor stuff and used for very cheap concrete.—*Idaho.*

* * *

Better Materials Demanded?

Where a contractor can get a local product at a price that means more profit to him, he does not demand quality unless he is held by rigid specifications and inspections.—*Ohio.*

* * *

Customers are demanding more distinct sizes in screened materials.—*Indiana.*

Freight Rates

Railroads are willing to be reasonable.—*Nebraska.*

* * *

Yes, but we expect to correct them.—*Massachusetts.*

* * *

Some of our rates seem a little high, but, taken as a whole, we are very well satisfied.—*Indiana.*

* * *

We think it better to try to change the attitude of the railroad than to try to change specific rates.—*Tennessee.*

* * *

We feel there should be combination rates permitting movement over two lines at 85% of the locals.—*Wisconsin.*

* * *

Yes, because the rate structure for crushed stone is chaotic and it works a hardship on smaller producers.—*Ohio.*

We feel that rates are unfair because some of our competitors can ship for the same rates that we have, moving their material 15 miles before passing our station.—*Pennsylvania.*

* * *

Better Materials?

No; lower prices.—*Massachusetts.*

* * *

Fortunately, for us, yes.—*California.*

* * *

Yes, constantly; and they are unreasonable about it in some instances.—*Oklahoma.*

* * *

Yes, and we are arranging to wash all of our stone before shipping.—*North Carolina.*

* * *

They are educated to use a higher grade but they hate to part with the extra money.—*Florida.*

* * *

Some are, but an educational campaign in concrete is badly needed.—*Colorado.*

Preparation must be careful to meet highway and railroad specifications.—*Kentucky.*

* * *

Yes, but this is probably due to the fact that plants are gradually improving their product.—*Oregon.*

* * *

Yes, they are demanding washed stone, more uniform grading and more medium and less large-sized stone for concrete.—*Tennessee.*

* * *

Customers are demanding a much higher grade product. In the case of Iowa deposits this means a large amount of water, and still it is difficult to secure better prices.—*Iowa.*

* * *

This section of California is "chain banked" to death. Good crops, no prices, general lack of capital, and farmers losing their ranches to banks who are not farmers.—*California.*

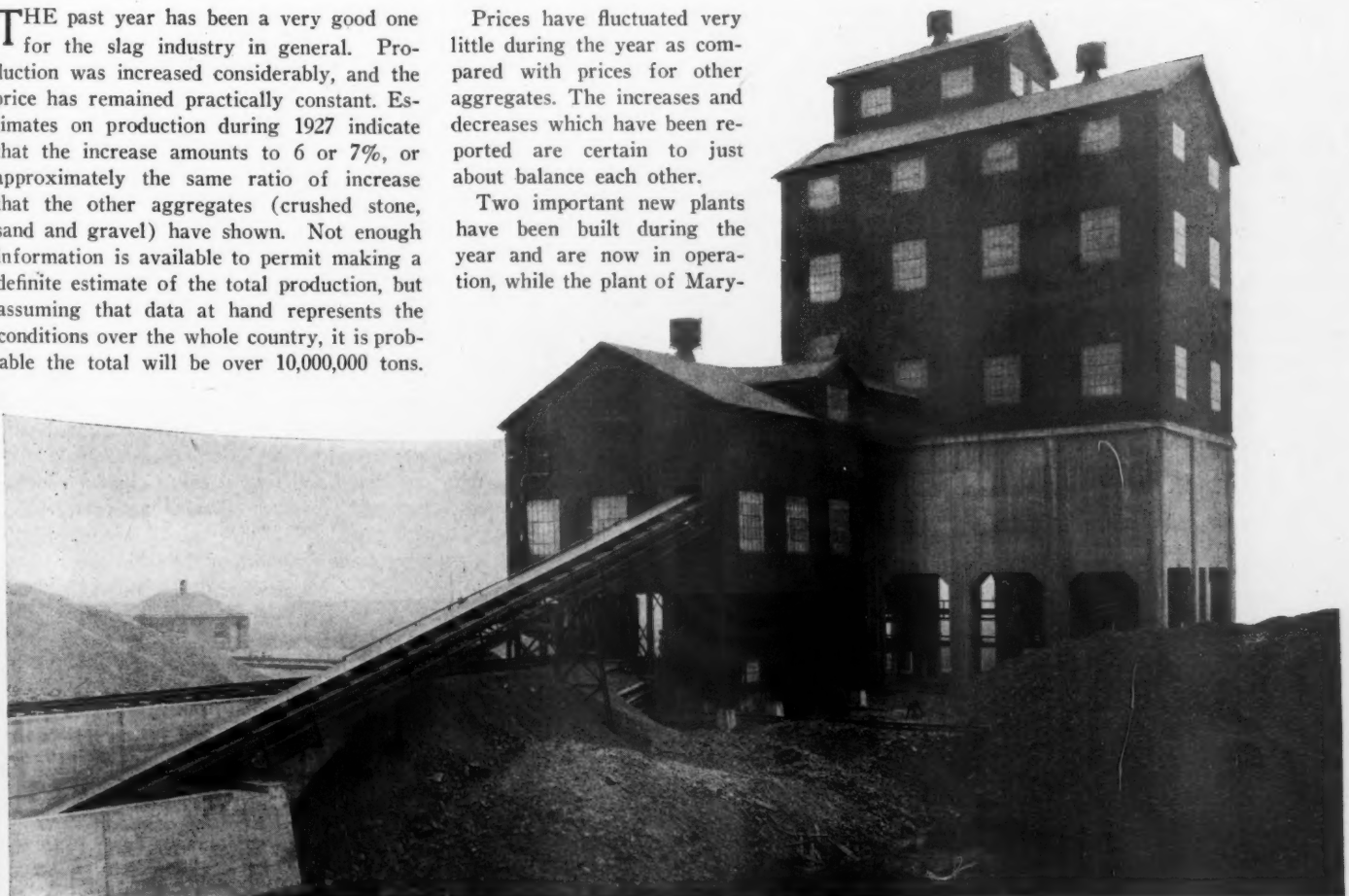
Crushed Slag Enjoys Prosperous Year

Production Is Increased as Two New Plants Commence Operations

THE past year has been a very good one for the slag industry in general. Production was increased considerably, and the price has remained practically constant. Estimates on production during 1927 indicate that the increase amounts to 6 or 7%, or approximately the same ratio of increase that the other aggregates (crushed stone, sand and gravel) have shown. Not enough information is available to permit making a definite estimate of the total production, but assuming that data at hand represents the conditions over the whole country, it is probable the total will be over 10,000,000 tons.

Prices have fluctuated very little during the year as compared with prices for other aggregates. The increases and decreases which have been reported are certain to just about balance each other.

Two important new plants have been built during the year and are now in operation, while the plant of Mary-



The France Slag Co. plant at South Chicago, Ill., is one of the important new plants of 1927

land Slag Co., a subsidiary of the Standard Slag Co., which was barely completed when reported in *Rock Products'* 1926 review number, started full operation early in the year.

France Slag Co. Plant at South Chicago

The new 120-ton per hour slag plant which the France Slag Co. of Toledo, Ohio, has completed at South Chicago, Ill., is one of the notable plants of the year. At the France plant, the slag is recovered by steam shovel from the slag pits of the Federal Furnace, and taken to the track hopper in standard hopper-bottom cars by means of a car puller. A belt conveyor raises the slag to a bar grizzly, the head pulley being a Dings magnetic separator for removing tramp iron. The oversize from the grizzly goes to a McCully No. 8 gyratory crusher, the discharge of which is raised by bucket elevator to the top of the plant, where another magnetic pulley on a short conveyor belt removes the iron liberated by crushing. The slag then passes to a 60-in. by 24-ft. revolving scalping screen, which was made by the France Foundry and Machine Co., and fitted with wire cloth from the Buffalo Wire Works Co. of Buffalo, N. Y. The two secondary screens, both of which are the same size as the scalping screen to permit interchanging of parts, receive the 3/16-in. to 1/4-in. material from the scalping screen. These screens are also made by the France Foundry Co. and equipped with Buffalo wire cloth. The finished sizes produced are 3/16 in. down, 1/4 in. to 2 1/2 in. and 2 1/2 in. to 4 1/2 in. from the scalping screen, and 3/16 in. to 1/2 in., 1/2 in. to 3/4 in. and 3/4 in. to 1 1/4 in. from the secondary screens. The slag is delivered directly to the bins through chutes particularly designed to permit the combining of any of the sizes in the bins. The bins are so arranged that any size of material can be loaded to either of the two tracks. The electrical features of this plant are particularly interesting, especially the electrically-interlocked, reverse-order, sequence starting arrangement for the motors, which prevents the overloading of the power line during starting, and does away with the piling up of material at any point in the plant.

D. W. Yambert of the France Slag Co. did the general designing and engineering for the plant and personally worked out the "hook-up" of the sequence motor control. Mr. Yambert has written a complete description of the plant for *Rock Products* which will appear in the issue of January 7, 1928.

New Plant at Erie, Penn.

The other important slag plant of the year is the Buffalo Slag Co.'s plant at Erie, Penn., which was completed during June. The completion of this plant marks the opening of the sixth unit of this company. All of the plants are located in western New York or Pennsylvania.

The slag for the Erie plant is obtained from the furnace of the Perry Iron Co. of Erie. It is hauled from the furnace in ladle cars and poured in molten form into slag pits at some distance from the furnace. The Buffalo company then excavates the cooled slag with a Marion, model 37, electric shovel on caterpillar crawlers. The shovel loads the slag into standard railroad hopper cars, which are moved to the unloading hopper by the company's locomotive. From the hopper the slag is fed to the crusher by means of a Webster 36-in. all-steel super-carrier. The crusher is a No. 7 1/2 Gates breaker.

The crusher discharge is then lifted by a bucket elevator to a height of 75 ft. and is discharged onto a 36-in. conveyor belt, which is equipped with a Dings magnetic separator pulley for the removal of all tramp iron. The 36-in. belt discharges the slag into a rotary scalping screen which separates the material into two sizes, minus 1 1/2-in. and plus 1 1/2-in. These two sizes are carried by chutes to two other rotary screens which complete the grading operation, and deliver the respective sizes to the bins for car loading. The iron removed by the magnetic separator pulley is returned to the iron company for remelting.

The plant is entirely electrically operated. The Webster carrier and the Gates crusher are driven by a 75-hp. motor through a Tex-rope drive. The elevator and screens are all driven by one 75-hp. motor, also. The only steam equipment in the whole plant is the steam locomotive and the locomotive crane.

There is an office building also, a 20-ton truck scale has been installed in connection with it. The plant is well situated for speedy truck delivery, as it is directly connected with the main section of Erie by East Avenue. The crushing plant has a capacity of 750 to 1000 tons of crushed and graded slag in a 10-hour day.

During the year the Birmingham Slag Co. of Birmingham, Ala., erected a new steel tipple at its plant at Ensley, Ala., to replace the former wooden one. This is the only major improvement to any existing plant that was reported to *Rock Products*.

No definite plans are announced for any new plants in 1928, but it is reported that P. J. McGovern of Louisville, Ky., is contemplating the erection of a plant at Rising Lawn, Ga., to use slag from old slag heaps in the vicinity.

German Consumption of Portland Cement in the Last 50 Years

EDITOR, *Rock Products*:

I HEREWITH beg to reply to your editorial, "A 25th Anniversary," p. 71, November 12 issue as follows:

You say that during the 25 years' existence of the American Portland Cement Association the cement consumption in the United States of America has increased tenfold, while you infer that the consumption

of cement in Europe within 50 years probably has not increased tenfold or anything like that.

This is an error, at least so far as Germany is concerned.

The quantity of cement produced by the German portland cement works was as follows:

In 1877 (the year of the foundation of the "German Portland Cement Manufacturers' Association"), 2,200,000 bbl.

In 1911, 34,250,000 bbl.

The shipments of cement for 1927 can be estimated at about 52,000,000 bbl. at the least, so that—after deducting about 10,000,000 bbl. for export purposes, there remain about 42,000,000 bbl. Therefore the cement consumption of Germany during the last 50 years has increased nearly twenty-fold.

CARL NASKE,
Charlottenburg, Germany.

December 6, 1927.

Ohio Sand and Gravel Men Meet

THE Ohio Sand and Gravel Association held its annual meeting in Columbus on November 30. Earl Zimmerman of the Ohio Gravel Ballast Co., Cincinnati, presided at the meeting and 26 members and guests were present. G. L. Schlesinger, director of the Ohio Highway Commission, spoke on the present status of road building in the state, and R. L. Brown, district engineer of the Portland Cement Association, pointed out the value to sand and gravel producers of the increased use of cement which necessitated the use of more and better aggregate. The principal address was given by Stanton Walker, director of research of the National Sand and Gravel Association. He spoke of the importance of research in the gravel industry and told something of the plans for a research laboratory to be established by the association.

L. K. Warner of the Marion Sand and Gravel Co., Marion, Ohio, was elected president. The other officers named are Fred Cornuelle, Red Bank Gravel Co., Cincinnati, vice-president, and Stephen Stepanian, Arrow Sand and Gravel Co., Columbus, secretary and treasurer. Earl Zimmerman, J. T. Adams, C. M. Ault and Clifton Houlihan were made directors of the Ohio association.

James L. Caldwell

JAMES L. CALDWELL, vice-president of the Signal Mountain Portland Cement Co., of Chattanooga, Tenn., died on November 19, at his home on Lookout Mountain following a long illness. Mr. Caldwell, who was 66 years old, was also a director of the Florida Portland Cement Co. of Tampa. He was prominent in other lines of business as well as in the cement industry being the organizer and president of the Tennessee Stone Works in Chattanooga.

Survey of Limestone and Phosphate Situation in the Midwest States

By J. R. Bent

Manager of the Limestone and Phosphate Department, Illinois Agricultural Association

A YEAR ago, in reviewing the agricultural limestone situation in the mid-west grain states, the writer endeavored to point out and to stress the fact that agricultural limestone, or "agstone" as it is now known, is becoming more and more firmly established as an independent and important commodity. The year 1927 has served still further to establish general recognition of its independent importance. Never before has the basic value of agstone in successful farming operations been so well recognized by the grain state farmers, especially in the territory east of the Mississippi river. The agricultural limestone "gospel" seems to have been gaining headway in theory more rapidly than it has in practice. One does not need to seek far for adequate reasons to account for the commercial demand thus lagging behind the developing interest. In most of the territory involved the demand has been inhibited during the last two years by the farmers' financial status or inability to buy. In addition, the wet weather conditions which prevailed throughout much of this same territory in the last three consecutive high demand periods (early fall of 1926, spring of 1927 and late summer or early fall of 1927) have made it physically difficult or impossible for many farmers to unload and spread limestone. Even with the restoration of good weather later in the spring the farmer was so far behind in his other work that he was loath to spend the time involved in applying limestone to his soil. Fortunately, October, 1927, was marked by exceptionally favorable weather which brought with it a recuperation of the demand for limestone shipments, and it seems probable, at the time of the preparation of this review, using Illinois as an example, that the year 1927, as a whole, will approximate as much agstone used as did 1926; i.e., 650,000 tons. The latter figure, with one exception, is the largest tonnage ever used by any one state in one year. It was exceeded only by Illinois' own consumption in 1925, which was 800,000 tons. Other states in mid-west territory have experienced more or less similar conditions, both as to prevailing weather and as to the financial status of the farmers. A somewhat detailed summary, state by state, will be found at the end of this review. It will be noted therefrom that Iowa is an outstanding example of rapidly developing use of agricultural limestone. It is only within the last very few years that agstone has been a factor in the minds of Iowa farmers. Soil surveys and

the work of extension authorities in that state have rapidly convinced the farmers that Iowa soils have already reached the point where liming is not only a benefit but in some cases a necessity. In spite of severe financial depression and some bad weather, Iowa apparently more than doubled its tonnage over the previous year, and the best estimates available at this time seem to indicate that it will show a consumption for 1927 of around 350,000 tons.

Trend Towards "Quality" Agstone

Viewing the underlying conditions over a period of years, there seems to be a distinct trend in the matter of quality. Producers and users of agricultural limestone alike are showing a disposition to make distinctions in the types of stone. For instance, some stones are dolomitic and some high calcium in character; some are soft and some hard; some porous, some dense, etc., etc. Such distinctions are being reflected both in the specifications under which agstone is produced and the methods under which it is used. These distinctions enter into the determination of the fineness to which the stone shall be ground, or pulverized; the quantity to be applied per acre; the season in which application shall be made, and the position in the crop rotation. As yet these considerations are all in the elementary or pioneering stage. It is the writer's belief that more and more attention will be given as time and experience may develop their relative importance.

Screenings Make Satisfactory Product

Farmers are learning to discriminate between the products of various producers on matters of purity and cleanliness. The producing companies are paying more and more attention to the quality of their product. No longer do either the sales or operating departments of the quarry companies look upon agstone as a waste or by-product undeserving of special care in its preparation. In a number of cases quarry operators are "scalping out" the fine material from the product of their primary crushers and disposing of it for other uses, such as railroad fill, secondary road construction, etc. These primary screenings carry the bulk of whatever dirt or impurities may get into the "quarry run." On the other hand, the screenings which come from the secondary and subsequent sizing operations are relatively clean and as a rule make a very satisfactory high grade agstone. Such care in preparation quite naturally has a tendency to

reflect itself in the selling price of the product, although it is not necessarily a prominent factor in the cost of production.

Standard Sizes Need Development

In the past throughout mid-west territory there has been a rather wide range of practice in the degree of fineness to which agstone is reduced in order to be considered satisfactory for agricultural uses. In some states the demand has been for a finely ground material; in others, decidedly coarse screenings have been used. However, during the last year there seems to have been a disposition for the extremes to modify their views. States which have used relatively coarse material, Illinois, for example, seem to be developing some demand for somewhat finer material. (This does not mean that there is any considerable demand in Illinois for finely milled stone, such as has been used in the eastern states in the past.) On the other hand, some of the states (such as Ohio) which have hitherto advocated and used rather finely pulverized or ground limestone, at relatively higher costs, are showing a disposition to modify this practice in favor of slightly coarser material. It is the writer's opinion that time will develop more uniformly standardized specifications which will take into account not only the need for a sufficient amount of fine, quickly available material, to give prompt corrective results in acid soils, but will recognize also the importance of the subsequent maintenance of a neutral condition in the soil and the gradual supplying of calcium, and to a lesser degree magnesium, as essential plant foods.

Should Meet Local Requirements

A desirable agstone should contain sufficient gradation of all sizes from the finest powder up to a maximum which may range from a tenth of an inch or an eighth of an inch in diameter to three-sixteenths or a quarter. Doubtless there always will be (and should be) some variation necessitated by variation in local conditions peculiar to the various states or districts. Some distinction should be made between material intended to correct highly acid soil and that intended primarily for maintenance purposes. Coarser material applied to acid soil will not accomplish the necessary correction rapidly enough. On the other hand, very fine material applied to a soil nearly neutral in reaction may result in chemical mass action which depresses or locks up other plant food elements, such as phosphorus, and may

also result in losses through leaching. The foregoing are but a few illustrations of the tendency to be more intelligent and exact in the production, sale and use of agricultural limestone as compared with the earlier "hit and miss" methods.

The trend toward improvement in quality and service has a tendency to be reflected in prevailing prices, but this is offset or neutralized to a large extent by the competition between the various producing companies, which is growing keener each year. Operators are realizing that successful competition is as dependent upon quality and service as it is upon prices.

Referring, again, to the development of potential demand for agstone among the farmers in the central states, it seems probable that more of the future increase will be attributable to the practice becoming more general among all classes of farmers, and to applications being made to a higher percentage of the tillable acreage, rather than to a practice of larger or more frequent applications on the individual acres.

Fair Selling Price Needed

The building boom which has been evident in some of the larger cities and the programs of highway construction have resulted in large production of concrete and macadam sizes of stone at many of the larger quarries. This has brought with it, in some districts, particularly in the Chicago territory, an accompanying surplus production of limestone screenings. In a few instances these screenings have been low grade as to agricultural value. The disposition on the part of the producer to dispose of such large accumulations at the best price he can get has brought about some break in price. This, in turn, has stimulated some demand from the farmers, who have taken advantage of the low prices. In consequence, the year has been somewhat ragged as to prevailing price levels in one territory as compared to another, and in certain periods of the year as compared with other periods.

In allocating the cost of production to the various sizes of stone the quarry operator is confronted with the need to choose between various theories which are somewhat conflicting in character. Some operators allocate none of the quarry and plant costs to their so-called "by-product" screenings. They prefer to assess it all against the other commercial sizes of stone and consider that the best price they can secure for the screenings, less the loading and sales cost, is that much "sugar" in their profit column. Other operators are disposed to pro-rate on a tonnage basis to all finished sizes of stone, including screenings, their ratable share of the total production and overhead costs without distinction as to relative values. This wide variation in accounting practice would seem to indicate an opportunity for a careful consideration, by the quarry industry as a whole, of the question, What constitutes a fair share of production cost to be allocated to the fines, or agricultural, sizes of stone? It

would be helpful if the producers and users of agstone could arrive at a mutually satisfactory understanding as to what constitutes a fair selling price, under normal conditions for this commodity, and an intelligent theory as to production cost is a pre-requisite.

Basis of Complaints Against Quality

The use of agstone by the farmers is highly seasonal in character. The period of highest demand is that of the late summer and early fall, following small grain harvest but before fall plowing and seeding; the second highest period is that of the early spring before plowing and seeding. Condition of roads and fields have a very direct bearing upon the spring demand. The shipping periods being crowded into such short spaces of time necessarily results in large accumulations at the quarries during the remaining periods of the year. Methods used in storage and recovery, therefore, assume considerable importance. In former years many quarry operators were satisfied to dump their surplus screenings wherever they might find room on their quarry and plant premises, and without having made any previous preparations. In many cases this resulted in contamination by dirt, refuse material, surface drainage waters, etc., and when the screenings were recovered, and loaded out on agricultural sales, many shipments contained unsatisfactory impurities, resulting in dissatisfaction, complaints and claims. Other material, which with reasonable care would have been satisfactory, was left on the ground around the plants or quarries, still in the way and unfit for sale. Quarry operators are now realizing that it pays to clean up, level off and provide adequate drainage for ground storage space. Another source of trouble and loss is the piling of various sizes of stone so close together that the material becomes mixed at the junction line. Still another cause for trouble is the overflowing of bins and chutes, containing coarser material, into the bin containing the fine agricultural stone. This can be remedied in many cases by flooring over the top of the agstone bins. The plant foremen should be taught to realize that quite frequently the objection to coarse material in an agricultural limestone shipment is not based upon the weight of relatively worthless material contained, but is due to the danger of breaking the farmer's limestone spreader, with resultant delay and expense. Most quarry operators have impressed upon their plant foremen the importance of care in cleaning the railroad equipment before loading. In the past, dirty railroad cars have been, and in some cases still are, an occasion for complaints and claims.

Frozen Shipments Expensive to Handle

Open car shipments during winter months carry a risk of freezing in transit. Some operators feel that they can reasonably avoid such a danger by loading only dry material. If the product has a fair percentage of fine dust in it, rains in transit

will permeate only a few inches (unless the shipment is badly delayed on the road) and subsequent freezing will result in a crust of only a few inches, which can be broken. Material which is damp when loaded, and is subjected to subsequent freezing weather, is apt to freeze solid and the unloading is then a very difficult and expensive affair. Many farmers would be glad to receive, unload and distribute limestone during the winter months, when the ground is frozen and other work is light, if they were not afraid of just such experiences. The suggestion has been made that quarry operators might fix an insurance fee of perhaps five cents or ten cents per ton as an addition to their regular price and in consideration thereof guarantee to the farmer his shipment against freezing. This experiment has not been tried.

This review would not be complete without giving some recognition to the fact that the railroads of the Middle West are showing more of a disposition to ignore the consideration of direct profit revenue per car in their freight rates on agricultural limestone, looking, instead, for their reward to come through the increased thrift and prosperity along their rights-of-way, as a result of greater use of agricultural limestone. The lowest possible freight rates are a great factor in promoting such use.

A questionnaire which the writer sent to agricultural authorities in various mid-west states has brought the following responses:

Earl E. Barnes, assistant professor of soils, Ohio, reports Ohio will use approximately 225,000 tons of agricultural limestone during 1927, which represents about 8% increase over last year. Weather conditions have been favorable and the farmers' financial conditions against as large a tonnage as might otherwise have developed. The sentiment for the use of agricultural limestone is developing more rapidly than the practice. Prof. Barnes thinks that there is a tendency toward slightly coarser material, known as "limestone meal." This grade is material all of which passes a 4-mesh sieve, 80% a 10-mesh, 30% a 50-mesh and 20% a 100-mesh.

At the time of going to press no report has been received from Indiana, Michigan, Wisconsin or Missouri bureaus. It is the writer's understanding that these states are all developing more recognition of the importance of agricultural limestone.

Iowa, as already pointed out earlier in this review, has increased its consumption tremendously during the past year, probably using about 350,000 tons. The limestone legume program seems to have been a major one with the agricultural extension authorities in Iowa, and had it not been for the farmers' poor financial condition and for bad weather and roads, the consumption of agstone in Iowa during 1927 might have been much larger than it was. According to J. L. Boatman, Iowa's extension associate professor of soils, who supplied the information for his state, the tendency there is toward a more finely reduced form of stone

Conditions in Ohio

By W. H. Margraf

Secretary-Treasurer,
National Agstone Association

than has been the practice in the past.

Advice from **George Roberts**, head of the department of agronomy at the Kentucky College of Agriculture, is to the effect that Kentucky used in 1927 about 132,000 tons of ground limestone, 10,800 tons of marl and 6600 tons of burnt lime. This is about 30,000 tons more ground limestone than was used in 1926. Professor Roberts states that these figures are based upon 70 counties which have reported in detail. Twenty-five per cent is added for the remaining fifty counties which are without extension service.

Financial conditions, more than weather, prevented greater use. The farmer is becoming more convinced of the value of limestone, largely through demonstration work by the extension agents. The tendency is toward somewhat finer material.

Mr. McSewell, associate professor of soils of Kansas, reported 28,000 tons used in that state, an increase of about 3000 tons over 1926. The increase has been due to the work of the extension department in educating the farmer. But here, again, financial conditions and wet weather in the eastern part of Kansas have stood in the way of a greater use. Sentiment is growing favorably and the demand is for somewhat more finely ground material.

D. L. Gross of the Extension Agronomy Department, Nebraska, reports practically no agricultural limestone used in the state.

Rock Phosphate Situation Improves

The situation in ground rock phosphate has seen gradual improvement. The tonnage shipments from Tennessee production points to Illinois for direct application to the soil in 1927 will probably be the largest since 1920, or slightly more than 1926 or 1925. These three years were much the same, from about 25,000 to 27,000 tons each. Some of the other grain belt states, particularly portions of Iowa, Wisconsin and Kentucky, are developing some interest.

The most significant facts connected with the production, sale and distribution of ground rock phosphate are: First, the tendency for the companies to thoroughly organize sales work through full-time trained salesmen in the field; second, improvement in the product itself, largely in the matter of grinding. Specifications on this point are much more rigid than formerly, agricultural authorities and farmers realizing that this has much to do with early availability in the soil. A third significant development is that of new and better methods in application to the soil. These center around the idea of thorough mixing or dissemination in the tillable soil. These improvements in product and its use are bringing results in the crops, especially on soils reasonably supplied with organic matter, which are stimulating a new interest in this commodity as an economic direct source of phosphorus as a plant food, and it seems probable that if production costs and sales price can be held at reasonable figures, the demand will steadily grow in future years.

ACCORDING to reports from the extension department of the Ohio State University the sales of all grades of liming material for use on Ohio Soils have practically doubled between the period of 1920 and 1925. The sale has reached nearly a quarter of million tons during the year 1925. Due to unfavorable weather conditions at the time of the year at which liming materials are usually applied to the soil the sale fell off slightly in 1926 and it is estimated that nearly a quarter million tons will be used during the year 1927, notwithstanding the fact that possibly one-third of the tonnage applied to the soil in the spring of 1927 was carried over from the material stored in the fields during the fall of 1926 and which was not applied to the soil due to inclement weather and applied this spring.

Increased Sales in 1927

The slight increase in sales in 1927 over 1926 is quite significant as indicating a growing interest in the use of liming material for improving the crop producing capacities of the soils and would seem to indicate that the general need for liming materials is at last becoming recognized by the farmers taking into consideration the fact that the farmer is complaining of a scarcity of money on the farm. We feel that had the farmer been better fixed financially there would have been a satisfactory increase in tonnage over the amount stated above. The weather in the past few years has no doubt curtailed the use of limestone, and it is possible that large bulk shipments of liming material in carlots is another thing that operates most seriously to keep down the tonnage of limestone sales. Applying a 50 or 60 ton carload of bulk limestone to a 30 or 40 acre field is in itself a problem, all things considered, to make any farmer hesitate before giving the limestone representative his order. But considering the above reasons which might have curtailed the use of limestone a gradual increase in the demand of agricultural limestone will continue to grow until at least three-fourths of a million tons (and this is a comparative figure) will be applied annually to the Ohio soils.

The introductory stage of limestone has passed. It appears that enough is known about the good effects of liming material on acid soil to justify its regular and continued use. The fact that a quarter million tons of agricultural liming material are now used on Ohio farms indicates that a great many farmers are ordering their limestone from the quarries each year and this number is growing. The farmer of to-

day can have his soil tested by county agents, teachers in schools of vocational agriculture and producers of agriculture limestone maintain laboratories and will willingly test soils free of charge and have representatives that will go out in the field and test the farmer's soil and when a farmer finds that his soil is acid it is high time to apply liming material.

Pulverized Limestone Popular

A recent investigation of what is actually taking place in the use of liming materials in Ohio, particularly proves that notwithstanding the high cost of the more finely pulverized, sacked material, its use is increasing in popularity over the coarser products, namely, screenings or meal.

By ordering a finely pulverized limestone a farmer can utilize his fertilizer drill applying one thousand pounds of the finely pulverized limestone with as good results from its use on the crop immediately following the application as he is likely to secure from a ton of the ground limestone or intermediate grade and possibly two tons of the agricultural limestone meal or two and one-half tons of screenings. The smaller quantity required of the pulverized limestone and the fact that it is in 80-lb. sacks, very convenient to handle, is quite likely to make all the difference between getting it done and not getting it done. The convenient manner of applying the finely pulverized limestone enables the farmer to actually follow the slogan of a railroad company which is as follows: "Put it on, don't put it off."

Storage Bins a Great Help

Limestone storage bins have aided in the solution of this problem in some localities. The truck has been a very important factor in various locations in Ohio in getting limestone to the field. Many tons are hauled direct from the quarry to the farmer within a radius of 20 miles from the quarry and the trucks are used quite frequently in unloading carloads on various sidings. The location of the farmer's field to the railroad station always favors the cheaper, coarser products, if the haul is very short, but a supply of the limestone in bags, maintained at all times by the dealers in the different towns ready for delivery to the farmer any time the weather is satisfactory, together with the fact that a fertilizer drill will do the work providing the farmer hasn't a limestone spreader, will have a great deal to do with increasing the use of limestone to a point where it is no longer a limiting factor in crop production.

Lime Industry Suffers from Loss of Business and Low Prices

A Most Critical Period Is Being Met by Disorganized Manufacturers

THE lime industry has been through many vicissitudes in the United States, but none, we believe, more demoralizing than the present situation. A widespread lessening of ordinary dwelling and apartment building, together with a lack of organized effort to hold on to what part of the building lime business was left, will probably account for a 10% decrease in lime production in 1927 as compared with 1926. Prices are estimated to have shrunk about 10% also from 1926 prices. If this is the case, production in 1927 was something less than 4,200,000 tons or not much above the 1924 figure. A 10% decrease in price would make the average price received at the plant in 1927 about \$8.20, which is the lowest price since 1917. The total value of the 1927 production on this basis was \$34,440,000, the lowest figure since 1922.

The loss in business and in prices was quite general east of the Mississippi River, where the bulk of the lime industry is. In the Southwest and the Pacific Coast sections business was apparently about the same both as regards prices and production, as in 1926.

A Number of New Plants Add to Capacity

Notwithstanding the conditions described there are still optimists in the lime industry, for several new plants were built or under construction in 1927, and most of them in the East where competitive conditions have been about the worst. The most important of these new plants are two rotary kiln operations now under construction near Pittsfield, Mass., both of which were briefly described in *ROCK PRODUCTS*, November 26. One is the 2-kiln plant of the Hoosac Valley Lime Co., Adams, Mass., which will have a capacity of 200 tons or more per day (8x150-ft. Traylor kilns), and the other the Berkshire Hills Co., Great Barrington, Mass., with one 7x120-ft. Vulcan kiln (about 75 tons per day). The Berkshire Hills Co. plant has some interesting and unusual features of design, including something entirely new in lime plants, so far as we know—a large covered storage shed for limestone storage. These two plants add a producing capacity of about 80,000 tons a year to a district that shipped 154,000 tons in 1926.

The New Jersey Lime Products Co., Ogdensburg, N. J., completed a 4-shaft-kiln lime plant with a daily capacity of 60 tons, designed by R. K. Meade & Co. The

Myerstown Hydrated Lime Co., near Lebanon, Penn., was reported to have completed a new 25-ton a day plant. The Everett-Saxton Co., Everett, Penn., is building a lime and hydrate plant to have a capacity of 75 tons per day. Walter T. Bradley, Swatara, Penn., is reported to be building a 100-ton per day plant.

In the Ohio finishing hydrate field two new plants went into production in 1927—the Gibsonburg Lime Products Co., whose new 100-ton a day plant was described in *ROCK PRODUCTS*, September 3, and the Bruns Hydrated Lime Co., Woodville, Ohio, whose plant (75 tons per day) was described in the October 15 issue. This may not be the total of new production added to the Ohio finishing hydrate field in 1927, but it represents a total of 50,000 tons a year to a small district which produced about 500,000 tons in 1926—a 10% increase. The Limestone Calcium Products Co., Rocky Ridge, Ohio, is a new incorporation, which, according to its president, A. S. Derringer, intends to build a finishing lime plant there. This is evidently a new name of the Benton Lime and Stone Co. project.

In the South, the Limestone Products Co., Ocala, Fla., is constructing a thoroughly modern 6-shaft-kiln lime plant with a hydrate manufacturing unit, the capacity to be about 100 tons of lump lime per day. The Southern Lime Products Co., Cincinnati, Ohio, leased the Alabama Lime Works, Fort Payne, Ala., and is reported to have made additions and improvements. The Muscle Shoals White Lime Co. was sold to the Yourtee-Roberts Sand Co., Chester, Ill., and it is reported the new owners will make changes and improvements. The Calera Lime Works, Calera, Ala., installed a hydrate plant and made other improvements. At Oglesby, Tex., the Lone Star Lime Works were leased to the Universal Gypsum and Lime Co., Chicago, and extensive additions and improvements are under way.

In the Central belt, through the Mississippi Valley states, the industry was particularly quiet, except for construction work on the new plant of the Batesville White Lime Co., Batesville, Ark. This plant, when completed early in 1928, will be, probably, the finest in the Southwest, and one of the largest and most modern in the country. The Pierce City Lime Co., Pierce City, Mo., was recently reported to be planning the installation of new equipment. The Missis-

sippi Lime and Material Co., Alton, Ill., definitely abandoned its lime operations there, to concentrate activities at the newer plant at Ste. Genevieve, Mo. The Western Lime Works, Ste. Genevieve, Mo., has installed new coal-handling equipment which is said to make the plant one of the most efficient in the industry.

On the West Coast the principal development seems to have been the formation of the United States Lime Products Co., San Francisco, Calif., primarily a merger of the Nevada Lime and Rock Co. and the Pacific Lime and Plaster Co. The incorporation of the Oregon White Lime Co., Oregon City, Ore., for \$50,000 was noted in July, and reports progress on its new plant. The Western Lime Co., Seattle, Wash., was incorporated in April for \$80,000, but its present status is not known. The Union Lime Co., Tehachapi, Calif., installed a 50-ton hydrating plant. The Sierra Lime Co., Sacramento, Calif., was incorporated for \$100,000, but its subsequent history is unknown. The Orcas Island Lime Co., Bellingham, Wash., took over the lime plant and property of the American Smelting and Refining Co. on Orcas Island, and are reported to have made extensive improvements. Lime Products, Inc., Portland, Ore., was reported early in the year to be building a lime plant at Orofino, Idaho. The Kunze Lime Co., San Francisco, Calif., is reported to have built a 10-ton a day lime plant in South San Francisco. The new lime plant at Enterprise, Ore., for the Black Marble and Lime Co., Portland, Ore., was still under construction on October 15, last.

What Ails the Lime Industry?

Editorially, during the year, *ROCK PRODUCTS* has expressed some opinions as to the trouble with the lime industry. Our annual questionnaires, which were quite liberally answered, give us an opportunity to check some of these opinions with those of lime manufacturers—large and small. Here are some of their comments:

"The lime industry certainly is enjoying the era of profitless prosperity which many other industries are also experiencing. This profitless prosperity is generally due to the sum of two factors—a slight decrease in volume, plus a considerable decrease in sales price; or, it can actually come about with some moderate increase in volume but a much more rapid decrease in sales price,

by reason of uncontrolled overproduction. The country is getting in many of its industries what the Sherman and Clayton laws seem to want. It will be interesting to note what effect this has in ruining many enterprises in many industries that are now going through this era.

"The lime industry like many other industries is certainly full of disorganization, due to the lack of confidence. The lack of co-ordinated promotional effort is partly responsible for production being in excess of the purchasing power for lime products. If extensive promotional effort had been under way throughout the country and the lime industry had been willing to work together to this end, either nationally or through a series of groups, we should have seen consumption at least 15 or 20% higher today and, ordinarily, the market price, through natural forces, would have been substantially higher. In other words, we would have had a better balanced condition between our demand and supply, which always stiffens the market.

"In our estimation you lay too much stress on the lack of standards for lime products. While general standards are valuable and very helpful, there is such a variety in qualities and characteristics in lime products, particularly for chemical trades, that we are beginning to question too much standardization. However, in the construction and agricultural industries, standards are of more distinct help, providing organization work would separate the sheep from the goats in presenting the value of higher quality products to the consumer. I do not think, however, that the development of standards in lime products is of much help in the marketing situation, unless it is joined with extensive sales promotion efforts. In other words, the consumer must be sold on the differences in quality and realize that he can afford a somewhat better price for the higher quality goods. At present this is not recognized to any extent in the market."

"There are a few manufacturers of the smaller type who are so greatly overproduced and in need of immediate orders that their policies seem to promote a chaotic condition."

"Lack of ordinary business judgment and cutting prices never increases business."

"There is no co-operation and there are no accepted standards. If the industry were properly managed there would be standards for lime products."

"Should have but a few plants operating on a large scale to lower costs, hence lower sales price and still have a greater margin for research and study of 'vital statistics'."

"From the point of view of the small local producer the present situation is partly propaganda of the large companies with

established brands, represented by a lot of local agents who have no knowledge of the real facts or relative values of various kinds of lime."

"Standardization of the product and promotional efforts are possible only when profits are fair, so as to allow for such an item in the budget. The fundamental economic basis of the lime industry is bad at present. Continued violation of economic laws has brought about unstable conditions; but the readjustment will be even more severe."

"Producers have lost sight of quality in quantity production and price-cutting."

"High-cost labor conditions are retarding building operations."

"Do not think it possible yet to establish standardized lime products."

"How are you going to standardize a product that varies so much over the country?"

"Chiefly lack of standards and of national advertising, the latter due to lack of confidence among lime manufacturers."

"Supply is greater than demand, and too many small irresponsible producers."

"Lime manufacturers neglected years ago to defend, and to keep their products on the market. They sat asleep and let competitive materials get a march on them; and these have such a hold now that it will take an unusual united effort to dislodge them."

"Overproduction by too many small units; after these conditions have changed things may improve."

"No organization; no confidence in each other and no promotional effort—a purely chaotic condition spells it all."

"Lime plants have been located without regard to markets, the idea of the promoters being to absorb freight rates, in order to get a share of the business."

"Especially lack of standards and of co-operation; personally, would like to see government control of raw material to save waste now going on of valuable stone."

"The lime industry is in the most chaotic condition it has ever been. It is passing through a period such as it has never seen before. Fifteen or twenty years ago lime, always a cheap commodity, was sold at little profit because there were no figures on cost of production. In the last ten years the marketing conditions have been changed by the general distribution of the Ohio lime producers, which encroached on the local

territories and markets of others. In that time, while the Ohio hydrate sold as a specialized product, namely, finishing lime, distributors were reluctant to stock many varieties of lime and consequently pushed this one product for general use. Inroads into the building field have curtailed other producers and naturally the individual operator does not propose to be put out of business.

"There has been a sharp recession in price the past year or two, which has wiped out the profit the industry is legitimately entitled to receive. There is a serious overproduction of lime, especially in the Ohio field. Obsolete plants cannot produce lime cheaply and the more modern plants of the last few years will eventually put the lime industry into the class of others—that is, big production concentrated at low cost. There are no signs of immediate betterment and it looks like the survival of the fittest.

"The breaking down of the National Lime Association by selfish interests and promotional work under the guise of specialized products by a self-sufficient group has done more to break down the morale than anything else. This promoted lack of confidence in one another, and naturally lack of co-ordinated promotional effort. When one group of manufacturers undertakes to ride rough shod over others they are bound to meet resentment, and, naturally, distrust.

"The varieties of lime are too great to standardize all products, for classification of lime automatically establishes price differentials. There is not enough difference in the cost of production between plants in the same general localities, or even competing groups, to allow a wide range of price, and even that manufacturer having the most superior product will sell on the same price basis with that which is not so good. I doubt if a standard for lime products is the answer."

"The zoning of the producers as sponsored by the National Lime Association at its meeting at Sulphur Springs was not productive of the results hoped for. If it did any one thing, it had a tendency to organize one section against the others, which, from a co-operative and harmonious standpoint, was just the thing that should have been avoided. Since all sections are not favored alike in the quality of their resources and in their accessibility to ready markets, etc., it is only natural for them to make a strong bid for their share of the business.

"In conversation with a Virginia lime producer a short time before the last National Association meeting, he told me that while the association was meeting in his home state he was not going to attend because, as he claimed, some members of the association, himself included, were not living up to the principles of the association, as they were slashing prices for fair in their territory.

"From this we can see, if producers in one zone have no regard for their neigh-

boring producer, how can they be expected to regard a competitor in a distant zone who perhaps enjoys natural and territorial advantages which they are denied?

"The one essential that the lime producers of the country lack, and without which no association can hope to accomplish its aim, is to have as nearly as possible 100% unanimity in its ranks.

"Shortly before the 1926 meeting of the National Lime Association there appeared an article that was to apprise the lime manufacturers of the need of concerted action, not so much against the synthetic products that were fast making inroads on their product, but on the necessity of perfecting a material or a number of materials the base of which was their product, with which they could successfully combat the synthetic products.

"It is a regrettable fact that lime manufacturers are producing lime in the same form since hydrated lime became universally recognized, whereas gypsum producers have gone ahead by leaps and bounds. Their products are disposed of in numerous forms and ways to meet the requirements of 'most any builder.

"I have a letter from the head of a large lime producing concern, who says that gypsum will never take the place of lime. We agree with him that theoretically this is not yet possible, but practically it sure is giving the lime producers a run for their money.

"If conditions in the lime industry should become more chaotic before there is any marked improvement, we are likely to have one or more consolidations which will surely necessitate the independents co-operating more closely for mutual protection."

* * *

"We place lack of confidence as the principal difficulty, together with overproductive capacity. The question of standardization is such a broad one that we do not lay so much stress on it."

* * *

"The more than 200 uses for lime make standards useless and unwise."

* * *

"Standardization is certainly desirable. Organization of all plants is very necessary to accomplish the standardization."

* * *

A large number of other producers, all of them in fact with a single exception, agree with our own premise that present conditions are due primarily to the disorganized condition of the lime industry, lack of confidence, lack of co-ordinated promotional effort, and above all lack of standards for lime products. To answer that there are too many varieties and uses of lime to think of standardization is merely to beg the question, for the very object of standardization is to prove that there are not so many varieties of lime as the producer seems to think. Lime is supposed to have certain physical and chemical qualities.

These are not so numerous that they cannot be determined with accuracy. It then remains merely to classify these qualities, to classify the requirements for specific purposes, and to co-ordinate one with the other. Moreover, we believe that if there was more scientific control of lime manufacture there would not necessarily be so many varieties of lime—certainly not from the same plant and the same stone.

The Cost of Lime Manufacture

To most any disinterested observer it is hard to understand why it costs so much to make lime; why it costs as much per ton, or almost as much, as it does to make portland cement, which is a far more elaborate manufacturing operation; why, apparently, large operations have little or no cost advantage over small operations. It is idle to say there are too many small operators and that they are the disrupting influence. Under the law of economics—the law of nature in survival of the fittest—the small operator has just as much cause to live as the big operator, so long as his costs of operation are on a par with the other fellow's—all ethical considerations aside. A few comments on this subject follow:

"In the average lime plant the raw material has to be separated and prepared with so much more care in order to free it of undesirable veins of bad rock, and in order to get it to a size suitable for kiln burning, that the raw material costs of stone per pound of lime burnt are substantially higher than the raw material cost per pound of portland cement produced. Portland cement operations can usually work a great variety of veins together and get an average analysis that will be all right, and with large unit shovel operations, whereas, we do not know of any lime plant that can normally take advantage of these economies to such an extent.

"The lime industry is mostly made up of smaller plant units, and these plant units cannot produce as economically from the point of view of costs of skilled supervision and greater labor per unit of production."

* * *

"Competitive conditions have made it necessary to produce a very high grade material. Research work in lime covers a far greater field than in the case of cement."

* * *

"Lime manufacture is not as modern as cement manufacture, also the cost of cement manufacture is spread over a much larger tonnage."

* * *

"Overhead is too great for the amount of business."

* * *

"Cement plants are more efficient than lime plants."

* * *

"The lime business of the smaller producers has been merely a process of swapping dollars."

"Costs are high because of waste stone in some quarries."

* * *

"The lime industry has not kept pace with the portland cement industry technically or financially. It is my opinion that the portland cement industry is rapidly approaching the same conditions, due to overproduction."

* * *

"Lime does cost as much per ton to produce as portland cement principally because of the necessity for selection of stone in the quarry, small production units, quality required and other factors."

* * *

"The portland cement industry has an advantage in the use of pulverized coal; and market demand for cement is much nearer the productive capacity of the plants."

* * *

"Quarry conditions in the lime industry make costs much more than in the cement industry. In most lime quarries the stone is hand loaded and hand sorted; and there is a larger percentage of raw material lost in the burning than in cement manufacture."

* * *

"Irregular production, lack of storage, hand loading in the quarry are responsible for high costs."

* * *

"Due to low daily tonnage output as compared to high daily tonnage in cement plants; and to ability of cement plants to use machinery to a larger extent than is possible in lime plants."

* * *

"Cement manufacture is handled with very large machinery units and without regard to impurities in the limestone, hence at materially lower costs."

* * *

"Small units increase costs. A lime manufacturing unit producing portland cement plant tonnages could produce much cheaper lime."

* * *

"Doubtless the chief influence in the high cost of producing a ton of lime arises from the comparatively small quantities in which it is produced. The average cement output per plant is possibly five to ten times as great as the average lime plant output. Economies in operation naturally result."

* * *

"Because of too many small unit lime plants. It should cost less with properly handled large units."

* * *

"Perhaps due to the imperfect manufacturing methods—not standardized or perfected."

* * *

"While we do not know the cost of making portland cement, we assume that the better supervision and control in the technical departments of the cement industry makes the operation more economical. The manufacture of portland cement is more detailed and possibly more complicated in making blends of the various elements, although

there are many studies to be made in the conversion of lime, especially calcining. So few lime manufacturers have technical men—the old rule-of-thumb methods prevail, and the result is a high operating cost. This can only be overcome by a long-time study of all methods employed.”

* * *

“Lime is mostly produced by antiquated methods, and because of wanting to maintain a standard (uniform quality) there has been practically no improvement in the method of production.”

* * *

“We keep two men busy full time trying to find out why it costs as much to make lime as it does portland cement—can't tell you in this space.”

* * *

The answer, we believe, granting that there is no very great difference in the average cost of a ton of cement and of a ton of lime, is that there is a loss of about 12% more raw material in calcining and far more man-hours per ton of lime than per ton of cement. This latter differential is caused both by larger production per plant and by far greater mechanical handling in the cement industry. While it may never be possible to go quite so far in the elimination of labor in lime plants, the average lime plant today certainly has a long way to go in more efficient mechanical handling of its product.

Plastic Limes and Hydrates

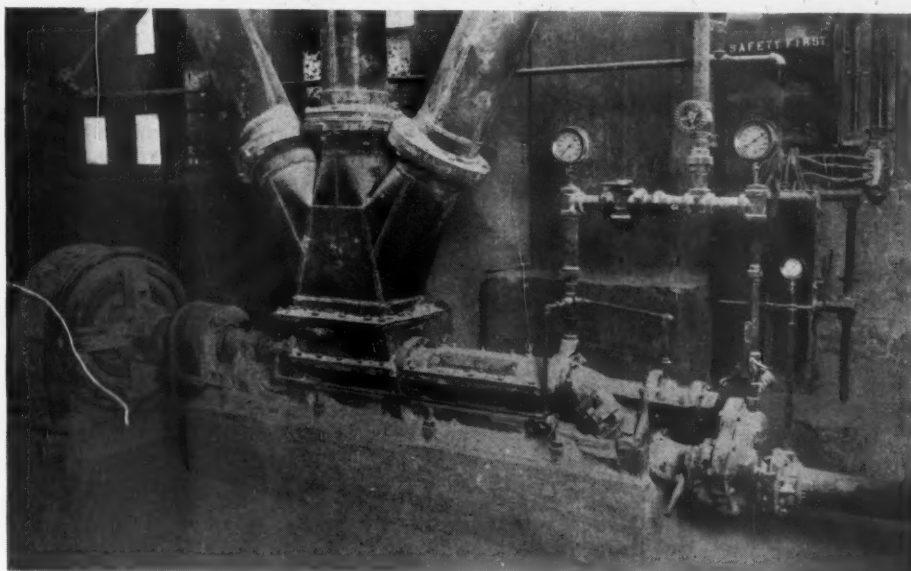
While organized co-operative research in the lime industry ceased nearly a year ago, research on the part of many individuals did not. Their efforts have been mainly to find a way to make plastic hydrates, or to supplant plastic hydrates with pulverized lime. The one department of the lime industry which probably has shown real growth and development in 1927 is the manufacture and marketing of pulverized lime. It was the mainstay of the business in New England, and the building material markets of Boston, New York and other Eastern cities are pretty well sold on pulverized lime. In the Chicago market pulverized lime has been introduced by the Marblehead Lime Co., and it is meeting with a very favorable reception.

The breaking up of the National Lime Association and the organization of a relatively strong group of Ohio finishing lime manufacturers for national promotional and advertising activities undoubtedly gave impetus to the search for a substitute for Ohio finishing lime on the part of lime manufacturers in every section of the country. The result is several patents covering processing of ordinary limes to give plastic hydrate, and a determined effort to make pulverized lime serve the purpose. How successful these efforts have been we let producers themselves state:

“The problem of plastic hydrates has been solved. It only requires plant development

and promotional work largely to bring around the supply of plastic limes by limes from nearby producing districts. On account of the small amount of real scientific control of plant practices, and the small amount of promotional work done in the lime industry, it may of course take from five to ten years before this evolution oper-

“We do not believe the problem of making plastic hydrates has been generally solved. Curing lime putty to increase plasticity and use of certain patented processes for the same purpose will not increase the general use of lime; rather it will secure for certain well located plants business at the expense of present plastic lime producers.”



A recent installation of a pneumatic pump for conveying pulverized lime

ates on a big basis. In other words, the loss of this character of trade by the Ohio finishing hydrate manufacturers is likely to be gradual, but over a five-year span it probably will be substantial, aside from any question of change in trade demands.”

* * *

“The problem has been solved, and through the manufacturing process only.”

* * *

“Helped but not solved.”

* * *

“Believe progress has been made.”

* * *

“There is much room for improvement.”

* * *

“Much work yet to be done.”

* * *

“In one instance yes; aged lime putty is the answer.”

* * *

“The problem has not been solved, in our opinion. Unless lime building products can be radically improved, we will be fighting a losing game. The future of lime lies in the chemical and agricultural markets. We have found the distributing agencies for agricultural lime are poor in our territory, and in two places we have increased sales by 100% by adopting modern sales methods.”

* * *

“Very interesting developments and the solution seems to be in sight.”

* * *

“Problem not solved but headway is being made.”

* * *

“To a great extent the problem has been solved. Plastic hydrates will appear quite generally in all sections of the country in the next year or two.”

* * *

“The problem of making plastic lime has absolutely been solved by aged lime putty. A cheaper, better and more convenient way of handling this material to the trade is all that is needed.”

* * *

“No, the problem is not solved. Other factors equally important as plasticity—namely, tenacity or backing, hardness, etc., have to be determined and standardized, as well as cost of colloids added, etc., etc.”

* * *

“The problem of making plastic hydrated lime has been solved by four different men, each with a process. The naturally plastic hydrates will have to look to their laurels in the future. That manufacturer who brings out a patented process for converting his lime into plastic hydrate merely puts himself in a competitive situation with such as the Ohio hydrates. If those in the industry who have not a natural plastic hydrate are to progress, the answer in way of meeting the inroads by the Ohio hydrates is not through a similar material, though a local trade may be developed due to the high competitive freight rates.”

* * *

“Expect further developments soon; there are several agencies at work with this end in view.”

It should prove consoling to Ohio finishing lime manufacturers that as many or more lime producers than those quoted are quite emphatic in their opinion that the problem of making ordinary lime hydrates plastic has *not* been solved. They are not Ohio lime manufacturers either.

How Long Will the Present Crisis Last?

Any one who has read this far must have a rather gloomy impression of the lime industry. Is there yet a silver lining showing through the clouds?

"No signs of betterment."

* * *

"Our outlook is OK, but our market is very local."

* * *

"Demand off; prices dropping."

* * *

"Expect the demand for agricultural lime to be better in 1928."

* * *

"Very few encouraging signs in a general way, but our company hopes for a small increase locally."

* * *

"Lime production will have to be put on a percentage basis like steel and chemicals."

* * *

"No positive signs of betterment seen."

* * *

"Conditions as regards relations of manufacturers, one to the other, are the worst I ever saw. No relief in sight."

* * *

"Truth and honesty do not seem to exist to any marked degree among the lime manufacturers of this section, and for that reason each one seems to be deathly afraid of the other; consequently each is trying to cut the other fellow's neck. So long as that condition exists so long will the lime business be a profitless one, and unless the entire central west group of operators come to their senses, and either co-operate, co-ordinate or consolidate, there will be nothing in the game for any one for years to come."

* * *

"We look for conditions to become more chaotic before there is any marked improvement."

* * *

"Conditions, as far as we can see, will improve somewhat in 1928, particularly in building lime."

* * *

"From our viewpoint conditions look more favorable in 1928."

* * *

"We think we have seen the lowest point as to prices and production."

* * *

What To Do About It?

There would seem to be but one angle of the situation left to discuss, agreement being practically unanimous that the situation is about as bad as it can be, and that is what can be done to better it. Here are

some suggestions by lime manufacturers:

"Probably both co-operation and consolidations are needed, but it cannot proceed until the obsolete plants are more or less removed from the picture and co-operation and consolidations can develop among the more modern and more economical plants that are equipped and managed to produce high quality lime products for which a profitable price can be secured, without the continual market sniping by the irresponsible small operator with cheap and low-grade products. To our mind it may be anywhere from two to five years before the atmosphere will clear sufficiently to put the industry on a sound basis. In the meantime, however, there may be local steps taken which will work towards the ultimate end, but industrial evolution of this kind takes many years to work out and, under conditions that are existing at this time, there must be great losses throughout the industry until the old economic law of the survival of the fittest begins to re-shape the conditions. The history of the world is full of these struggles.

"In a recent bulletin of one of the big national banks in New York it was clearly pointed out the falseness of a policy which, through co-operation or consolidations, attempts to support and keep alive the economically unfit enterprises in any industry. Sooner or later the public must pay for unsound co-operation. This, of course, is a harsh doctrine, but out of the workings of this doctrine eventually emerge the sound enterprises that can most economically provide their contribution to modern life. In the end the people as a whole benefit by these severe evolutions. The lime industry and many industries are in these throes at this time.

"Since there are so many individuals in the lime industry who cannot see the standardization and promotional needs so as to keep the consumption above production, or equal thereto, the only other course that is left is to let the industry go ahead on its present course and ultimately purge itself of the unfit operations and individuals through the operation of natural economic laws. The fit will have to struggle through this period, and will probably not make much money, if at all, and it may take several years before the fit emerge into profitable enterprises. Our company has reconciled itself to accept a period of little or no profits which may last for some years while these economic laws are working out, as co-operation and co-ordination in any large way seem to be hopeless after years of effort that have been expended in this direction. Here and there local efforts of co-ordination and of local promotion will be undertaken and relieve local situations while the general evolution is working out. Most of the lime plants today are so obsolete that they are not intrinsically worth twenty-five cents on the dollar of book values that they are carrying representing their costs. Of course, the people who own such plants and

have put their money in them are still struggling on hoping to get their dollar back. This is the tragic part of these evolutions. Such people continue to spend more money in a way that is not helping their permanent situation and is only prolonging the agony because they do not see the big forces that are under way.

"The country is full of these hopeless situations in the lime industry today, in our estimation, by reason of the large number of small units that have come out of the soil. We can see no cure but evolution and sacrifices, and taking the losses that the present era of large scale economic production and the promotional efforts by stronger companies for their personal behalf are forcing upon the small, unfit, poorly managed, low-quality plants."

* * *

"Must have unity and sell at a living price."

* * *

"The sooner we get together, the better."

* * *

"Need of good common sense among buyers or consumers, and the suppression of so-called 'good salesmanship' in the business."

* * *

"Co-operation, a drastic change in the freight-rate structure, which will decrease the size of almost every lime manufacturer's territory, intensive sales methods in smaller areas, standardization of product, insofar as it is possible; and finally research to determine the proper methods of manufacture."

* * *

"A dominating combination, developed in each district, with a later combination of the district combinations."

* * *

"Only cures are co-operative promotional work, confidence in the industry and a more organized condition."

* * *

"Research and promotion."

* * *

"The ills would best be cured by a return to the policy of an active and energetic National Lime Association, the same as was inaugurated under the presidency of Geo. Wood, to support which every lime manufacturer in the United States should come across."

* * *

"Anything that would discourage others from entering the lime business."

* * *

"Co-operation all along the line and promotional work."

* * *

"Better salesmanship; more co-operation; more education for the user."

* * *

"National advertising, co-operation and consolidation, chemical research, differentiation between building lime and chemical lime in promotional work; standardization

in manufacturing methods, larger use of machinery, cost accounting for every plant instead of guesswork."

* * *

"In our territory a general overhauling of freight rates, putting each plant on a flat mileage scale, thus leaving every man to his own territory, would help. Our competition is too keen for all to live."

* * *

"Consolidations are the cure; nothing else will solve the problem. Ten to twenty large producers could soon straighten out the trouble."

* * *

"Complete cure of the present unsatisfactory conditions cannot be accomplished. We can only strive for betterment. There are certain kinds of lime being produced in certain locations and under certain conditions that obviously do not belong. Sooner or later many of these plants must close to the subsequent advantage of the remaining plants who are better situated and who produce better material. In this connection, the lime producer who is unable to produce a high grade of chemical lime, or a thoroughly satisfactory finishing lime, is in a particularly disadvantageous position. The masons' hydrate lime business is highly competitive, since the material can be produced by any plant capable of making a lime of any kind. This competition within the industry supplemented by competitive masonry materials outside the industry, offers but little encouragement. We are unfamiliar with any standard of quality in general use as applied to masons' lime, nor are there any generally recognized tests whereby the mortar strength, etc., of lime mortars can be easily determined. Lack of standard in the first case; and lack of rule whereby to measure the quality of the lime in the second case, makes it impossible for a manufacturer of a thoroughly better masons' material to definitely prove the superiority of his product. Lime being lime, the low price rules. It is up to the lime industry in co-operation with other proper agencies to develop a standard and a test for masons' lime, and thereafter for the industry to accept such standard.

"The plastic or finishing lime companies have been reasonably successful and because of the general definite value of their goods are well situated. Similarly, the producers of high grade chemical lime with the great number of chemical uses of lime and a constantly increasing population calling for lime for purification and waste disposal purposes are well established. It is the producer of a lime of no outstanding merit and therefore of no particular definite use that is suffering. Such plants can only be saved as a part of the industry by joining hands with the producers of other limes in the development of better practice in use of lime for building construction, etc.

"Proper promotional efforts without doubt could stimulate the increased use of lime

in water-proofing concrete, for mortar in wall construction, and to a very great degree, reclaiming from the hard wall people, a large volume of the plaster business. These results can only be accomplished by joint promotional efforts, no one, two or few producers being able to lift the entire so-called masons' lime business out of its present condition. Frankly, we very much question whether such joint promotional effort is possible and are rather inclined to the belief that increased profits to those engaged in the lime business will result not so much from an increased demand for the so-called masonry limes as from a decreased number of plants producing this grade of material. It would not be surprising if the producer who can market his material as a masons' lime only, has not about run his course and that the masons' lime required by the building industry will be supplied by either the finishing lime people or the chemical lime companies as more or less of a side issue."

* * *

"The best thing would be consolidations and freight rates put on a mileage basis, each plant standing on its own merits and distance haul."

* * *

"Raise the standards for the product and educate the users to quality by co-operative advertising."

* * *

"More knowledge about the stone, consolidation on lines similar to the General Motors, or U. S. Steel Corp.; standardization of limes for *every use* and guarantees by lime manufacturers that lime they make is properly made."

* * *

"The ills of the lime industry are, first greed to get business at losing prices, second antagonism among the operators, third, too much deception."

* * *

"Consolidation is one answer to the chaotic condition. The elimination of the small uneconomic unit is a foregone conclusion, for the lime industry cannot stand in the way of progress and business must progress or be eliminated by competing materials. Units will have to be brought together to reduce operating expenses, principally overhead and administration, and capital furnished to carry on intensive research work, not particularly on new uses for lime but a better knowledge of the old uses. Without disturbing the industry possibly the best way to proceed would be to have group consolidations, eventually leading to a few national organizations which can produce and distribute lime cheaply."

* * *

"Some great efforts for co-operation, and no doubt there will be some consolidations. A little more congeniality of live and let live."

* * *

"Unquestionably new materials which

have come on the market within the past generation have had the effect of securing a large amount of business which previously had gone to lime. Whether this would have happened if the lime industry had been alert and had proper vision at that time is beside the issue. These competing materials are here and are going to stay here. It is now up to the lime industry to find uses for lime which will create a demand for this product. Unquestionably the only way to accomplish this is through promotion work or research work in some form, but at the moment I am not ready to say along what lines we should proceed. I have the confidence to believe that there is sufficient ability in the lime industry to put this job over, but it cannot be done by sitting around a table and have someone tell us of the honorable character of the lime business, etc. We have got to look the facts in the face and when we recognize just what is required then we should have sufficient courage to take the first step."

* * *

"First, consolidation of minds and the use of common intelligence in marketing. Did you ever hear, nowadays, of the commonest laborer underbidding his fellow workman for a job?"

* * *

"Consolidation, and as soon as someone can start it."

* * *

"Co-operation is very desirable; consolidation will accomplish the desired result sooner, but that would seem to be very far off."

* * *

"Rigid promotion and education among the trade to bring it back, and prompt action on all new uses to check substitutes at the beginning would very much strengthen the position and tonnage."

* * *

"One of the best omens of the future of lime is the many inventions relating to lime products listed in ROCK PRODUCTS. There is no ill, the lime industry is in good health."

* * *

"Co-operation, and immediately. No one can profit on a basis that does not tend to help the other man."

* * *

"Complete co-operation is impossible because of keen competition. Consolidation of some of the more successful concerns would aid in making for better co-operation among the independents."

* * *

"In the absence of co-operation nothing but consolidation can solve the problem, but this will have to be promoted by outside interests."

* * *

"Consolidation is the answer. Owners must stand ready to turn in their plants for what they are worth, not what they think they are worth."

"Co-operation yes, but if you turn to consolidations, how about the little fellow?"

* * *

"Co-operation can be and should be practiced at all times; but consolidation at present seems impossible."

* * *

"No prospects for either co-operation (that is, entire or approximately entire) or consolidation in the near future, at least five years."

* * *

"Co-operation rather than consolidations, in my opinion, is the logical answer. The lime industry is one of small scattered concerns; in event of consolidations the independent producer with a favorable freight rate would considerably hinder the proper development of large corporations."

* * *

"Consolidations no doubt, but a good substantial small plant in the midst of a consumer community should not be closed out if those consumers must pay an increase of 30% to 50% more for lime brought in from great distances."

* * *

"Consolidation of lime plants is only a matter of time; it may be two or three years, but it is the only solution. It is taking place in all the principal industries."

* * *

"A strong man in the industry would help — a Judge Landis."

* * *

"Co-operation is possible, the means are at hand and should be used, but I cannot see any signs of action."

* * *

Conclusions

Our correspondents have been nothing if not frank. They have given all shades of opinion; they have laid bare all the skeletons in the closet of the lime industry; they have made suggestions for a cure, some practicable and some not.

We would be inappreciative in return if we did not make a suggestion ourselves. Our suggestion is a real national convention of the lime industry, the sooner the better. Let it be held in Montreal or Quebec, so as to get lime manufacturers a little out of surroundings which are so depressing to them now.

A few lime manufacturers saw these conditions coming a year ago. An urgent request to all manufacturers to attend a convention at White Sulphur, and meet the issue, met with a response of hardly more than a corporal's guard.

Probably most lime manufacturers are now convinced that the issue was as serious as it was represented to be at that time. It may be too late to interrupt the slow grinding of the "mills of God" which will soon eliminate some lime producers, tem-

porarily anyhow, but the effort to make peace and prosper should be worth what it costs.

Maybe at Montreal or Quebec, far from their homes and business troubles, in a foreign land, lime manufacturers will "snap out of it" and look upon each other as natives of the same country and "brothers under the skin."

Fortunately, in spite of the seriousness of the situation, at least one lime manufacturer has preserved his sense of humor and his humanity. Witness:

"In the matter of the lime industry, I can best express my viewpoints by a story."

"In North Carolina, the most out-of-the-way place that can be found where a Methodist preacher has ever survived or eked out an existence, is called Shut-In. Shut-In, as its name would indicate, is a point that is difficult to reach, and lies in the Great Smoky Mountains.

"It has been a custom of the bishops to send any preacher to this appointment if he ever got to showing a proud or haughty look, or if he looked particularly sleek and

fat, because a year in Shut-In would humble a Roosevelt, or reduce a Taft till he would look like Coolidge.

"It is a custom in North Carolina when the Methodist preachers assemble to have a report from each charge, and always when it came to Shut-In the heads of the preachers would fall on their chests, and great groans would be heard everywhere, both because of the remembrance of past affliction and because they knew the report would be painful.

"At a conference when Shut-In's name was called the usual groans were heard, when, to every person's surprise and delight, the brother from Shut-In got up and said, 'Brethren, Shut-In is looking up.' Then hallelujah sounded here and there and praise God, and the word glory was passed from lip to lip.

"When the noise subsided the brother from Shut-In continued, 'Yes, brethren, Shut-In is looking up because it can't do anything else; it is on the flat of its back.'

"That is my viewpoint on the lime business."

Sand-Lime Brick in 1927

ESTIMATED production of sand-lime brick in 1927 is 320,000,000 brick as compared with 330,586,000 produced in 1926, a decrease of about 3%. This estimate is based on direct returns from 26 producers and an analysis of the monthly statistics published in *Rock Products*. These data are furnished regularly by sand-lime brick producers throughout the year and can be considered as representative of the entire industry. Shipments amounted to 204,000,000 brick (estimated) and stocks on hand at the end of December about 22,000,000 brick. Unfilled orders amounted to about 23,000,000 brick, which total will probably be exceeded many of the orders calling for spring delivery.

The data furnished *Rock Products* by producers at monthly intervals has been interpolated to give some sort of an estimate for 1927. Figures for 1926 are taken from the official report of sand-lime brick prepared by the U. S. Bureau of Mines, Department of Commerce.

A comparison of the monthly statistics is tabulated below:

PRODUCTION, SHIPMENTS, STOCKS AND UNFILLED ORDERS OF SAND-LIME BRICK, IN MONTHS, 1927

Month	No. of plants reporting	Production	Shipments		Stocks at end of month	Unfilled orders
			Rail	Truck		
January	28	8,307,000	3,824,000	5,378,000	16,455,000	17,908,000
February	31	9,577,000	5,185,000	6,418,000	13,215,000	12,580,000
March	28	16,748,000	7,707,000	10,811,000	13,802,000	25,415,000
April	30	16,217,000	6,229,000	10,884,000	8,493,000	18,413,000
May	29	23,225,000	8,196,000	13,250,000	8,740,000	17,237,000
June	28	17,987,000	7,757,000	14,010,000	10,052,000	18,344,000
July	23	16,662,000	5,431,000	10,751,000	8,820,000	14,364,000
August	25	21,300,000	7,375,000	13,294,000	12,547,000	19,800,000
September	26	21,680,000	6,729,000	11,815,000	18,689,000	16,094,000
October	23	18,928,000	5,134,000	13,623,000	14,423,000	15,318,000
November	25	18,086,000	6,558,000	11,833,000	13,468,000	14,845,000
December*	27	15,000,000	6,000,000	10,000,000	15,000,000	16,000,000
Total		203,717,000	76,120,000	132,067,000		

*Estimated for 27 plants.

PRODUCTION OF SAND-LIME BRICK IN THE UNITED STATES, 1926 AND 1927

	1926	1927*
Number of plants	42	40
Production	330,586,000	320,000,000
Stocks on hand Dec. 31	22,033,000	22,000,000

*All 1927 figures estimated.

Adverse weather conditions slowed up building in many sections of the country in which the principal markets for sand-lime brick are located. Some plants in the East and the Middle West maintained 1926 production levels and even exceeded their last year's production, but these gains were offset in the grand total by the large declines recorded from Florida, that state not yet having recovered from its slump. In other localities building conditions were just poor. Prices were generally firm throughout the year, an average for the country being about \$12.50 per thousand, less than received in 1926. Again Florida was the main cause for this lower average price, one producer in the locality reported getting about the same price he got during the great depression year of 1914. The following are aver-

age quoted prices received by sand-lime brick producers during the month of November:

Average Prices of Sand-Lime Brick for November

Shipping Point	F.O.B. plant	Delivered
Albany, Ga.	\$ 9.00	.....
Atlantic City, N. J.	14.00	.....
Buffalo, N. Y.	12.00	\$16.50
Columbus, Ohio	14.00	15.00
Dayton, Ohio	12.50	.....
Detroit, Mich.	14.25	16.00
Flint, Mich.	11.00	15.00
Grand Rapids, Mich.	.....	.....
Hartford, Conn.	14.00	19.00
Jackson, Mich.	12.25	.....
Madison, Wis.	12.00	13.00
Michigan City, Ind.	11.00	.....
Milwaukee, Wis.	10.50	13.00
Minneapolis, Minn.	10.00	12.75
New Orleans, La.	.....	.....
Plant City, Fla.	10.00	.....
Pontiac, Mich.	12.00	14.50
Rochester, N. Y.	.....	19.75
Saginaw, Mich.	12.00	.....
Sebewaing, Mich.	.....	.....
Sioux Falls, S. D.	12.00	14.00
Syracuse, N. Y.	18.00	20.00
Toronto, Canada	.....	16.00
Toronto, Canada	13.50	16.00
Winchester, Mass.	.....	16.00
Winnipeg, Canada	.....	14.00

New Plants

Only two new sand-lime brick plants were under construction in 1927. The Atlas White Brick Co., Atlantic City, N. J., has almost completed a new three-unit plant at Berlin, N. J., on the Pennsylvania railroad. The entire deposit of 21 acres of ground surrounding the plant has been thoroughly prospected to a 50-ft. depth and the sand found suitable for the sand-lime brick process. The Paramount Brick Co.'s new operation at Brooklyn, N. Y., is to be a four-press affair, of which two presses are at present installed. The plant will start production early in 1928.

The Standard Press Brick and Tile Co., St. Louis, Mo., is reported to be planning the erection of a three-press plant of 60,000 brick per day capacity.

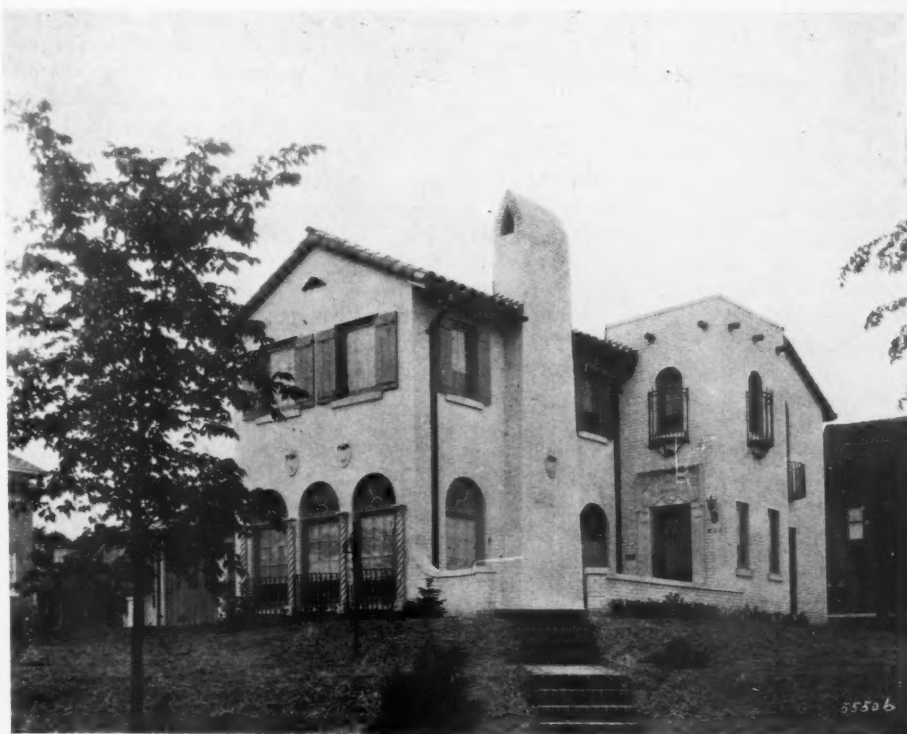
Plant Improvements

The improvements made by the American Brick Co., Boston, Mass., were described in detail in *Rock Products*, March 5. Changes at the Winchester Brick Co. included a rod mill which replaced the wet pans, a volumeter and an overhead crane for handling finished brick. The Sand-Lime Products Co. installed a new Jones underfeed stoker (illustrated, *Rock Products*, January 22) and a Hoppes feed water heater. A new hardening cylinder was installed at Boice Bros.' plant at Pontiac, Mich. The Albany Brick Co. enlarged the plant of the Silica Brick Co., Albany, Ga., which they purchased early in 1927. The Lakeland Brick and Tile Co., Lakeland, Fla., was purchased by C. U. Cadwell and the name changed to Lakeland Silix Brick Co. Other plants besides these undoubtedly made improvements during the year.

Sand-Lime Brick Surfacing Successful

The inherent advantages of sand-lime brick for sustaining walls and backing are well known to many builders, but only recently has the use of common sand-lime brick, white or colored, been used to any great extent in exterior or surface wall con-

fect condition with entire wall intact. Again, in a competitive test with clay brick to determine which type of brick was to be used for backing a ceramic kiln, the sand-lime brick was the only one to remain intact, the clay brick melting entirely during the firing period, which was carried on for 48



Handsome Milwaukee residence using sand-lime brick facing

struction. Many new schools, other public buildings, and in some cases apartment houses have used sand-lime brick surfacing with success. Its use is fast extending to residences of the type pictured herewith and make attractive, economical dwellings which compare well with similar structures which use the more expensive clay brick surfacing.

It took two disasters to bring out prominently qualities in sand-lime brick which were heretofore recognized only by a limited number. The first, the Florida hurricane, to which clay brick representatives were hurried, showed the marked superiority of sand-lime brick masonry. The clay brick industry was put in a sorry position, for a report by its engineer, which attempted to show by photographs and so-called data that many of the worst features in the storm were from other than clay brick construction, was found to be amusingly erroneous—many of the examples offered being proven to be of clay brick construction.

Fire-Resisting Qualities Tested

Fire-resisting qualities of sand-lime brick were demonstrated in a practical way (though it is hardly to be recommended as standard practice) through a fire at Atlantic City, N. J. For five hours, the sand-lime brick wall of a large building was subjected to the intense heat from an adjoining burning building and came through in per-

hours and reached a maximum temperature of 2255 deg. F.

The report of the 1927 convention published in *Rock Products*, February 5 and 19, contains much more information along the lines of the above—all of which proves sand-lime brick has quality and only needs more publicity to make its use widespread.

Sand-Lime Block

Sand-lime block are now a regular item of production at the Grande Brick Co., Grand Rapids, Mich., and Saginaw Brick Co., Saginaw, Mich. A regular power face-down block machine, identical with those used to make cement block, is used by the Saginaw company, but a stripper is also being installed. The block is popular in foundation construction. A complete report on its manufacture was published in the February 5 issue. Other companies are also experimenting on sand-lime block and it is probable that several will manufacture it in 1928.

Technical Developments

A new mechanical "grab" for handling brick from the hardening cylinders to stock piles or trucks, manufactured by Sutcliffe, Sparkman and Co., Lancashire, Eng., and marketed by R. S. Lackey, Buena Vista, Va., was described in *Rock Products*, February 19 issue. This machine has been installed at the American Brick Co., Boston, Mass.

Gypsum Production Grows a Little

Competition Keen and Prices Off in 1927

THE past year has shown further evidence of stabilization in the gypsum industry, a process which has been in the making since the industry pushed its way into the ranks as one of the foremost of the rock products operations. Production, based on direct returns from 31 producers, increased about 2% over 1926, giving an estimated total for the year of 5,748,150 tons, as compared with 5,635,441 tons in 1926. This crude production is the largest ever recorded, exceeding the record 1925 production by about 70,000 tons. There was an increase of production from new activities in Michigan and New York, but probably at the expense of older operations. Decreases were reported by several producers in New York, Iowa and Texas.

General Price Decline

All the standard gypsum products, such as wallboard, block and plaster, declined in price over the year 1926. In some sections the price received was 25% under that of 1926, a fair average estimate of the entire country probably is a 5 to 8% reduction. Thus, the total value of all gypsum products will be below that of 1926, despite the increased production. Many reasons have been attributed for the fall in prices, chief among which was the increased competition in a market which did not increase in proportion to the capacity increase of the year. Our analysis shows about 25% increase of capacity for 1927, whereas new building was the same or a little less than in 1926. Hence, the plants operated only up to about 65% of their capacity (figuring 90% capacity in 1926). Other important factors were the increased economies effected in manufacturing which were passed on to the consumer in the way of price reductions. In several instances, much of the incidental costs of starting up new plants, plant improvements and other changes made during 1926, had been taken care of and the producers were able to offer products at a lower price. On the West Coast a dealer's war lowered the ultimate price but had little effect on prices received by the manufacturers. Increased imports of gypsum were listed as an appreciable factor in cutting into prices of one producer.

Few New Companies

The number of new companies and corporation changes during 1927 was not as large as in former years, only 10 incorporations notices (including increase of capital by present concerns) being recorded. The total of capitalization represented was \$14,545,000, most of which was covered by

capital increases of concerns already in the field. On the other hand, considerable money was expended by active concerns during the year on plant improvements, which did not find its way into this record, the new financing being carried on within the company. Two mergers of importance were consummated, the Schumacher Wall Board Corp. (Seattle, Wash. plant) combining with the Western Wallboard Co. to form the Gypsum Products Corp. and the consolidation of the Alabastine Co., Ontario Gypsum Co. and the Toronto Builders Supply Co. to make the Canadian Gypsum and Alabastine Co., Ltd. The Beaver Products Co. acquired the plant and holdings of the Southern Gypsum Co., North Holston, Va., early in the year by direct purchase for a reported price of \$750,000.

Plants Increase Capacity

Many companies carried out extensive plant improvements, principally towards an increase of capacity. The Beaver Products Co. installed what is reputed to be the largest wallboard dryer in the world at its Akron, N. Y., plant and made other general changes. The entire plant has been practically rebuilt in modern fireproof construction and new kettles installed. At the Gypsum, Ohio, mill, the steam boiler unit was discontinued, a program of electrification having been completed during the year. The North Holston, Va., plant (formerly the Southern Gypsum Co.) was improved and enlarged.

The New York City plant, Atlantic Gypsum Products Corp., which was damaged through fire last September, is being repaired and the company is making improvements and additions by which the capacity will be increased about 50%. New crushing, grinding, calcining and mixing equipment is being installed and the plant is expected to start up again early in 1928.

A new \$40,000 warehouse for gypsum products was completed last September by the Rumford Chemical Co., Rumford, R. I. The Structural Gypsum Co. has completed improvements at its Akron, N. Y., plant and is now making plans for the erection of a new plant at Linden, N. J., for the manufacture of a diversified line of gypsum products from synthetic gypsum. Three Butterworth and Lowe improved return 4-flue, 10 ft. dia. kettles will be installed in this new plant. The company has sold privately, \$750,000 of its class A preferred stock, the proceeds of which will be used in part for the new construction.

The burned portion of the Grand Rapids, Mich., mill of the Michigan Gypsum Co. is

being rebuilt and an unconfirmed report states that the Grand Rapids Plaster Co. is contemplating the operation of its Grandville, Mich., plant. Two new 8-ft. dia. kettles of Butterworth and Lowe design are to be installed at the Joliet, Ill., plant of the Calumet Chemical Co. This operation makes block of synthetic gypsum, the waste of baking powder manufacture and was described in detail in ROCK PRODUCTS, April 16 issue.

The U. S. Gypsum Co. completed many improvements scheduled in 1926, among which was the new wallboard plant at New Brighton, N. Y., said to be one of the largest in the country, also a \$1,000,000 paper mill at Kansas City and a \$40,000 factory branch and warehouse at Philadelphia. Three vessels, especially designed for gypsum-carrying, the *Gypsum King* (described in April 20 issue), the *Gypsum Queen* and the *Gypsum Prince*, were put into operation by the U. S. Gypsum Co. All three ships will operate between the Windsor, N. S., quarries and the New Brighton, N. Y., mill. The company is reported to be planning improvements to its Loveland, Colo., plant, which will cost about \$300,000, and new mills at Midland Calif., and River Rouge, Mich. The No. 6 mine at Plasterco, Va., one of the deepest in the world, the shaft extending 560 ft. down, was reopened in the fall.

The Universal Gypsum and Lime Co., Chicago, has completed several improvements to its Akron, N. Y., Ft. Dodge, Iowa, and Rotan, Texas, plants.

West Coast Activities

The Schumacher plant of the Gypsum Products Corp., Seattle, Wash., is being remodelled and, about \$30,000 in new machinery is being installed. As soon as the improvements are completed the entire production will be centered in this plant and the Western Wallboard Co. plant discontinued. The improved plant will be modern in every detail and is expected to have a capacity of about 6,000,000 sq. ft. per month of wallboard and gypsum lath. The Buttress Manufacturing Co., Los Angeles, Calif. it is reported, has expended over \$25,000 in new drying equipment in order to bring up its production. A new dryer was installed at the Plastoid Products Co. mill at Los Angeles and a new \$150,000 mill will replace the recently burned plaster plant of the Pacific Portland Cement Co., Consolidated. The new plant of concrete and steel will have a capacity of 300 tons per day, or 35% more than the plant which was burned. The Standard Gypsum Co., Seattle, has in-



New National City, Mich., gypsum products plant of the National Gypsum Co.

stalled a new partition tile plant and is contemplating building a wallboard plant. The company also improved its unloading facilities at Slip 4, Long Beach, Calif., at a cost of \$10,000.

Increased Mining in Canada

Many development projects were reported for Canada, the opening of a new Eastern plant (Atlantic Gypsum Products Corp.) and expansion of other plants in the East demanding additional supplies of gypsum. The Atlantic Gypsum Products Corp. began operating deposits at Cheticamp, Cape Breton, and installed a conveyor system and railroad spur to carry the rock from the mines to the harbor docks. The Canadian Gypsum Co., a subsidiary of the United States Gypsum Co., erected a new storage bin of 100,000 ton capacity at Deepbrook, N. S. The Canada Cement Co., one of the largest producers of crude gypsum in Canada, acquired new acreage at Antigonish and commenced development work. Plans for the new \$500,000 project include a crushing plant, two miles of standard gage railway, a new shipping pier, storage bins and a power plant. All-water shipments will be made to Quebec and Ontario. Options on several

sites of land near Rigby, N. S., for the erection of a \$100,000 shipping pier were reported to be taken by an American gypsum firm. The National Gypsum Co., Buffalo, is said to be interested in acquiring Deep Brook deposits.

The Iona Consolidated Gypsum Corp., Ltd., has taken over the plant and holdings of the Iona Gypsum Products, Ltd., and is planning to improve the present mill by adding new equipment which will also increase the capacity.

The gypsum industry in Western Canada continued to show steady improvement. In British Columbia, the Canada Cement Co. opened a new mine at Mayook and is shipping several cars a week to its cement mill at Exshaw, Alberta. At Falkland, the British Columbia Gypsum Co. is now shipping gypsum to its mill at Port Mann. The company is reported to be building a large addition to its Liverpool, B. C., plaster mill to provide increased facilities for the manufacture of wallboard. Several reports indicate the formation of a syndicate headed by John E. Mitchell of Bellingham, Wash., to build a new gypsum products plant at Vancouver, B. C., using gypsum from deposits near Falkland.

New Enterprises

New gypsum companies were incorporated in Oklahoma, Texas, Montana and Utah, but little of their intentions could be learned. Once again, as in many times past, claims have been filed on part of the extensive gypsum sands near Alamogordo, New Mexico. According to newspaper reports, the interested parties have investigated fully fuel and power costs, transportation to manufacturing centers and other details and are reasonably satisfied that the enterprise has commercial possibilities. Other projects reported under way include a new distributing warehouse on the municipal pier at Pensacola, Fla., by the Gulf Gypsum Co. at which barges would be unloaded for rail shipment to other points.

New Plants of the Year

New England entered the ranks of large gypsum manufacturing states, the new Portsmouth, N. H., gypsum products plant of the Atlantic Gypsum Products Corp. starting production in all lines early this year. Many interesting features in engineering and operations were incorporated in the design, the details of which will be the basis of a future article in ROCK PRODUCTS. The Na-



New type of asbestos-gypsum panels to be manufactured by the Beaver Products Co.

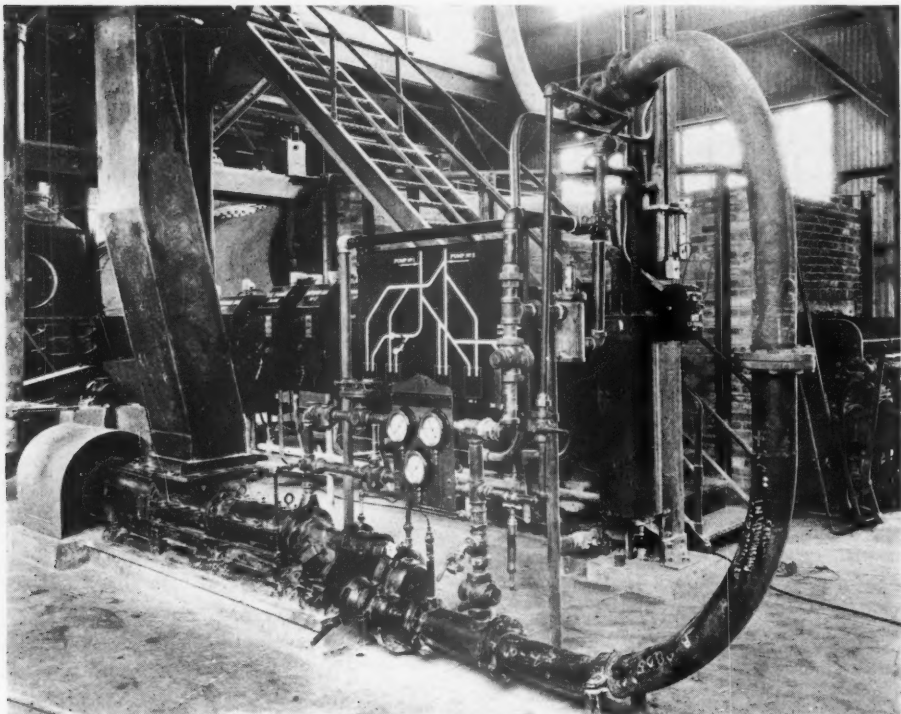
tional Gypsum Co.'s new mill at National City, Mich., was one of the outstanding plants of the year. The capacity of this plant is about 100,000,000 sq. ft. per year, production being maintained on one of the largest wallboard machines and Coe driers ever installed. In addition, it produces about 100,000 tons of mixed plaster per year. A

to have given entire satisfaction.

Longer wallboard machines and longer roll driers continue to be the rule, the large capacity and improved quality of the board achieved from these units being the main factors. The board machine of the National Gypsum Co.'s National City, Mich., plant is 625 ft., unsurpassed by any and only equalled

by the machine in the same company's plant at Clarence, N. Y. The dryer is 395 ft. long, one of the longest and largest capacity dryers ever built by the Coe Manufacturing Co. and capable of handling 250,000 sq. ft. per 24 hours. But even this has been exceeded for the new 8-deck Coe dryer installed at the Akron, N. Y., plant of the Beaver Products Co. has produced over 260,000 sq. ft. per day. This latter machine replaced the old type tunnel kiln and drying car system, just as it is fast replacing other and similar older types in wallboard plants.

Two novelties in manufacturing procedure emanate from the Caledonia and Montreal plants of the Canada Gypsum and Alabastine Co. and while they can hardly be classed as developments of the year (having been in use for about two years now) they are well worth mentioning. The first is the use of a vertical French dryer for drying the crushed gypsum, which in the plants noted has worked out quite successfully, power consumption, fuel costs and drying efficiency taken into consideration. The same company uses Raymond beater mills with air classifiers, of the type developed for hydrated lime, to remove rock or other impurities from the calcined gypsum. Of course, not all gypsum could be so treated but in this instance, the crude gypsum has a fair percentage of granite, difficult to remove by any sorting method before grinding and calcining and which if allowed to pass to the mixer might impart defects to the wallboard. Incidentally, the tailings

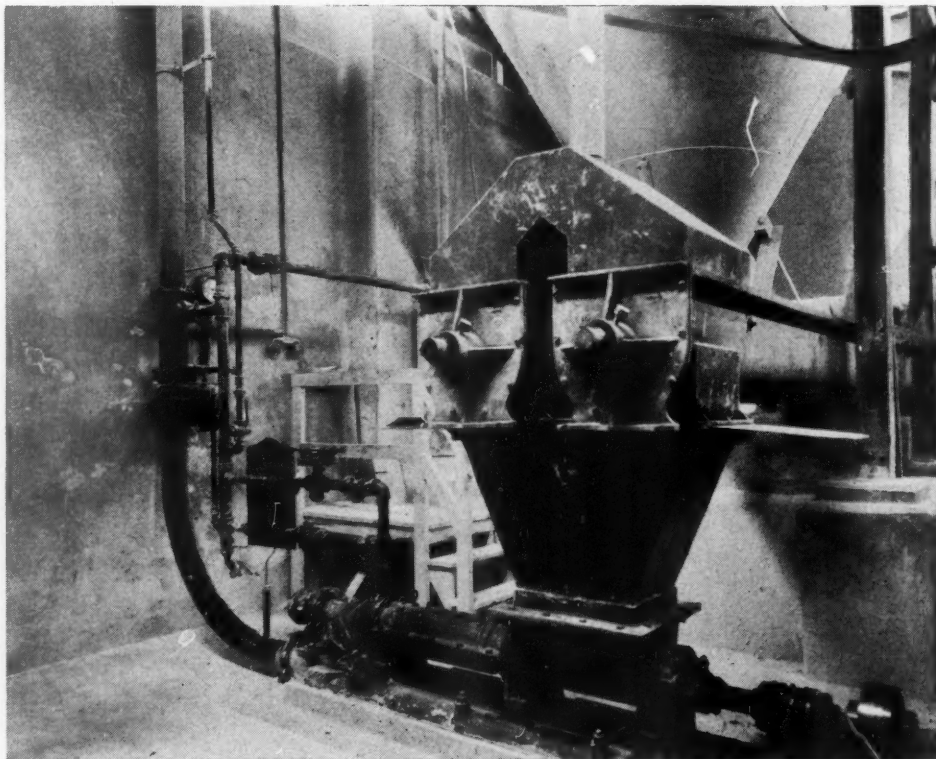


Special form of pneumatic dust pump for pumping raw ground gypsum to the kettles, Atlantic Gypsum Products Corp.

complete description of this plant was published in ROCK PRODUCTS July 23. On the West Coast, the Perfection Plaster Board Co. is now operating in a new plant at West Oakland, Calif., in which special machinery designed by J. F. Makowski, president of the company, has been installed. The plant has a daily capacity of 50,000 sq. ft. of wallboard and gypsum lath. The new block plant of the Pennsylvania Gypsum Co. at Chester, Penn., has two unusual features—a Gibraltar continuous automatic block machine making tile of 6-ft. lengths and a new type of automatic block dryer, the only one of its kind in the United States and specially designed for its purpose by the Coe Manufacturing Co. This plant was described in ROCK PRODUCTS, June 11 issue.

Technical Developments

The successful application of the Fuller-Kinyon system to the pneumatic conveying of raw and calcined gypsum was one of the noteworthy developments of the year. The installation at the Portsmouth, N. H., plant of the Atlantic Gypsum Products Corp. is the first of its kind and is believed to be a forerunner of other future installations for similar purposes at gypsum plants. Two pumps, one for the raw and the other for the calcined gypsum, have been in operation at this plant since it was built and are said



Pump receiving hot calcined gypsum from hot pit collector screws at the Atlantic Gypsum Products Corp., Portsmouth, N. H. This system delivers to board plant, packing bins, and block plant bins, with a by-pass branch for returning rejects to land plaster bins

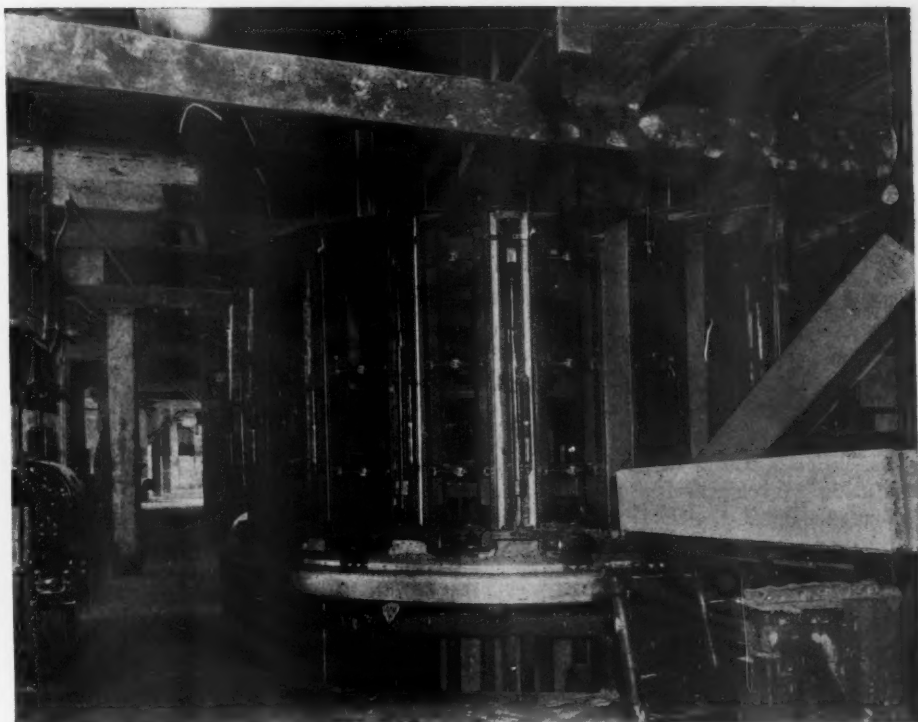
from the mill are reclaimed and used in the sanded plaster made by the company.

Developments in Block Manufacture

The automatic rotary block machine, introduced several years ago, is now becoming standard equipment for newer and modernized block plants. Hand manufacture of tile is not economical nor does it give the uniformity of machine-tile made by the automatic process and only in cases where special products such as roofing slabs are desired is the older method of manufacture used. Reinforced block, tongue and groove or smooth side type have been successfully produced on a Gibraltar machine at the Canada Gypsum and Alabastine Co.'s plant at Caledonia, Ont. So-called gypsum lumber which many gypsum manufacturers believe is one of the products which ought to be developed more, can be produced on this type of machine for it is designed to make tile in lengths from 4 to 6 ft. and 4, 5 and 6-in. thickness. The number of different types produced is shown in illustration in *Rock Products*, June 11.

Block drying is still a problem which presents serious difficulties, the present type tunnel kilns not yet reaching the efficiency that goes with large production. The Coe Manufacturing Co. has installed a new type of automatic dryer for this purpose at the Chester, Penn. plant of the Pennsylvania Gypsum Co. The principle of operation is similar to the well-known Coe dryer for wallboard. A description of this dryer and the large block machine referred to above was published in *Rock Products*, June 11.

Other developments of a chemical and physical nature will be referred to in abstract form in a later issue. All our read-



Rotary gypsum block machine producing all types of block up to 6 ft. in length

ers are no doubt familiar with the comprehensive article or rotary calciners for gypsum by J. Eklund, formerly process engineer for the U. S. Gypsum Co. (October 1 issue) and the excellent discussion on the manufacture of gypsum plasters by W. B. Lenhart, superintendent of the Standard Gypsum Co., Long Beach, Calif., now running in current issues.

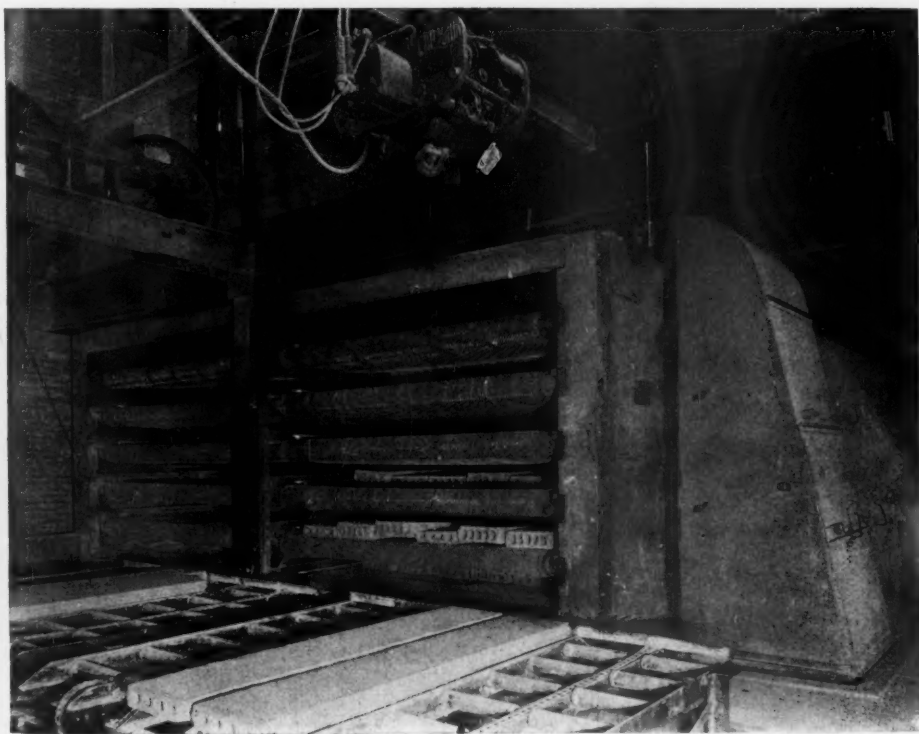
New Products

In a highly competitive field, such as gyp-

sum products manufacturing, it remains for the manufacturer to widen his scope of manufacturing and this can only be done by the introduction of new products. This year brought forth a number of gypsum product specialties, many of which are closely identified with the individual manufacturer producing them—an excellent safeguard which appears to have a profitable future.

The U. S. Gypsum Co. has brought out a system of sound insulation that embraces treatment of walls, ceilings, floors, columns, piping vents and mechanical equipment. The system is fitted to the individual job and selling and installation is carried on by a special division of the company. The company has also introduced a "Structolite" load-bearing tile for exterior walls and bearing partitions, a special cement, "Setfast," for laying up gypsum partition tile and bundled "Rocklath"—gypsum lath in two sizes, 16x48 in. and 16x32 in.

Acoustic plaster is now being marketed by the Standard Gypsum Co. under the trade name of "Calacoustic" and by the U. S. Gypsum Co. as "Sabinite." Other companies have brought out plasters for the same purpose or are engaged in developing them. Gypsum lath is now a product made by practically every wallboard manufacturer, the Gypsum Products Corp. making it one of its specialties. Locklath, an entirely new type of gypsum lath, manufactured by Plastoid Products, Inc., Los Angeles, Calif., was described in *Rock Products*, November 12. This product features a gypsum core covered with asphalt treated paper; the lath has one smooth face and one dove-tailed grooved face to provide additional bond for the plaster.



New automatic roller dryer developed especially for gypsum block

The Beaver Products Co. has acquired the patent rights to "Thermocrete," a cellular gypsum product for home use over ceilings and in side wall insulation, floor fill and roof deck insulation in hotel, office and industrial buildings. The company has also secured the United States patent rights for the manufacture of "Elo" panels, an English wall-board of asbestos, gypsum and other products. These panels have been used with success in European countries and a plant for their manufacture will be established at Buffalo, N. Y.

A new mechanical pulp for gypsum wall-board is under development at Iowa State College by George M. Seidel working on a fellowship established by the U. S. Gypsum Co. He is said to have been quite successful in his objective, a gypsum filled wallboard with fiber filler from cornstalks. A mixture of mechanical pulp and calcined gypsum produced a board, lighter than ordinary gypsum board and with good strength, according to reports.

Industry Makes Progress

The real growth of the gypsum manufacturing industry has taken place only within the last decade. A glance at the accompanying chart is illuminating; production in 1919 was about 2,200,000 tons, valued at under \$18,000,000 and 8 years later, or in 1927 the production had climbed to about 5,600,000 tons with a market value of over \$46,000,000. The development has been rapid, but not inconsistent, if we consider the future exploitation of gypsum products, which is bound to come and lead to greatly increased consumption, as the public learns to know more about uses of gypsum. This knowledge must come from within the industry, through educational campaigns something after the fashion in which the Portland Cement Association promoted the greatly increased use of cement. The present status of the gypsum industry is akin to the problems facing the cement industry in the early 20th century, ample producing capacity with a market which needed awakening. A point of similarity between the two industries is the early concentration of the cement industry in the certain district—something which has been largely outgrown at the present day. The opinion seems to be that too many gypsum plants are located in the East, too much concentration on a narrow geographical market, freight rates limiting shipments farther afield. But the all-important fact has been overlooked—if ever the large cities such as New York, Philadelphia, Boston and others really start to use gypsum products in the way they should, the plants supplying the district would be taxed to capacity. Some of the producers' comments on the present aspect and the future development of the industry are given below:

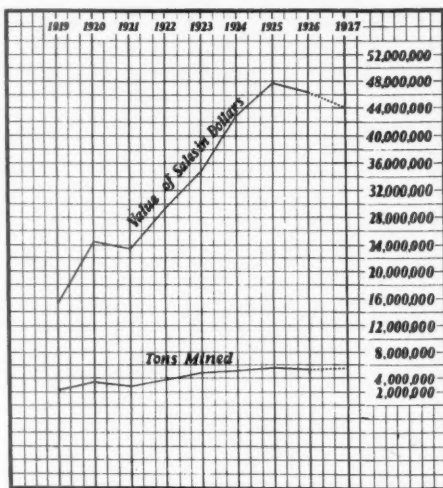
Comments From the Producers

"Competition is getting very keen and it seems right now more is produced than there is a market for."

"Wallboard industry probably developing too rapidly."

* * *

The industry seems to be developing too rapidly as regards production of present products and too slowly in the production of new products and in finding new outlets for present products.



Gypsum mined and sold, raw and calcined, in the United States, 1919 to 1927, inclusive

Getting to be too many plants in the East for comfort.

* * *

Believe the growth is normal.

* * *

Development too rapid in certain localities. There is a field for an increase in the gypsum industry, but development should be restricted market and by freight rates.

* * *

Doubtful if industry is developing too rapidly.

* * *

Very rapid development is being made, the number of manufacturers increasing faster than the demand for the product.

* * *

Industry will probably settle down in 1928 and 1929.

* * *

Increased demand for new products will wipe out any too rapid development.

* * *

Industry not developing fast enough in our opinion, due to slowness in educating gypsum users as to fireproofing and sound-proof qualities.

* * *

Industry in this locality (New York) has increased production capacities too rapidly.

* * *

Industry not developing too rapidly as there is apparently no limit to the use of gypsum.

* * *

Overproduction and the development of competitive substitutes will retard development of the gypsum industry.

Future efforts of the gypsum industry should be devoted to the development of new products for the construction trades, according to current opinions from producers. This includes such items as reinforced roofing and precast units, stress being laid on the desirable fireproofing and insulating qualities. Gypsum-concrete units for use in the proper places could be stimulated, particularly for roofs, non-bearing fire walls, fire stops, etc. One company is ready to bring out novelties such as toilet seats made of a gypsum combination. There is opportunity for a great expansion in the sale of gypsum for agricultural purposes, not only as a fertilizer but also as a mash ingredient and a sanitary, and disinfectant agent for use about chicken houses.

The Gypsum Industries, Inc., the national association of gypsum producers, has done much to promote the use of gypsum in agriculture, and this field should offer unlimited possibilities. Gypsum is a comparatively cheap source of two of the most important chemical elements in all organic life—both plant and animal—calcium and sulphur.

Research for a method to weatherproof calcined gypsum should be encouraged for a good process would open a large market for gypsum products to be used in exterior construction.

Bureau of Standards Tests Adhesion of Plaster to Tile

IN a brief report on a study of the adhesion of plaster or stucco to various kinds of wall surfaces, the Bureau of Standards has found that on all types but glazed surfaces the adhesion was sufficiently great for any normal use. Its statement in full text follows:

Hollow clay building tile form one of the important units in modern building construction. Because of the appearance of the joints and the non-uniform color of the tile, it is customary to either plaster or stucco the surface of the wall so that a pleasing surface is produced.

The adhesion of the plaster or stucco to the tile is of importance, as this factor determines whether the plastering will be permanent or whether a failure will result when the wall is subjected to unusual jars or strains.

The Bureau of Standards has measured this adhesion in several cases so that from the data thus obtained the best type of surface for receiving plaster might be determined. Three types of plaster, namely, cement, cement-lime and gypsum, were tested on three grades of tile, hard, medium and soft, with five types of surface, combed, grooved, wire cut, smooth and glazed. It was found that on all types, with the exception of the glazed surface, the adhesion was sufficiently great for any normal use. Plaster should not be applied directly to the surface of a glazed tile.—United States Daily.

Silica Sand Industry Finds Money Made in Specialties

Producers of Regular Lines in Strong Competition—
Does the Industry Need National Organization?

WHAT is the matter with the silica sand industry? The producers who answered *ROCK PRODUCTS'* questionnaire and who in many cases wrote personal letters to the editors giving their views about it, were all but one agreed that there was something very serious the matter with it, but they were not at all agreed as to what it was. And there was a similar disagreement as to what remedy should be applied.

Recognizing that the industry was neither as prosperous nor as contented as most branches of the rock products industry were, *ROCK PRODUCTS* early last fall wrote to the principal producers of silica sand to see if they did not think a national association would improve matters. This was also asked in the questionnaire. The replies that came in were of two kinds. Those who had given the matter much thought and who understood what a national organization could and could not do, were in favor of it. But those who had had an unfortunate experience with local associations, and who had learned to distrust such bodies, thought that a national association would not do much good.

Some of the producers flatly contradicted themselves. One said that the time was not ripe in his opinion for any sort of a national organization, but he closed his letter by saying that the greatest need of the industry was for producers to get together and become better acquainted. And another, who did not welcome the idea of an association enthusiastically, said that what the industry needed was confidence among the producers and the establishment of accepted standards, the particular purposes for which national associations are formed. And one very pessimistic producer wanted to see a war of extermination in the industry so that the weaker members might be killed off as soon as possible and the stronger be freed from their competition.

Effect of Importation

This year has seen a considerable increase in the importation of silica and silica products, especially glass. Knowing this, questions were asked as to the effect of such importations on the industry. Here again there was a wide difference of opinion. The majority of producers seemed to be more concerned with local competition, not realizing, apparently, that this competition and lowered prices could very well come

from a loss of markets to foreign products. Others said that the effect of importation was a detriment to the entire silica industry, and one who is in a position to know reported that Belgian and other foreign sands had entirely driven American sands from the Pacific coast, where they used to find a very considerable market. And it seems proper to add the testimony of the glass manufacturers, the principal users of glass sand, which was given before congressional committees, and which was to the effect that foreign importations had gravely, and adversely, affected the manufacture and sale of American glass.

The best evidence of the condition of the industry is to be found in the opinions of producers, which are quoted verbatim elsewhere in this review.

As to the production in 1927, it is *ROCK PRODUCTS'* opinion, based on an analysis of the questionnaires sent in, that production for the industry as a whole fell off certainly 10% and probably as much as 15% from the 1926 production. The price was considered by most producers to be unreasonably low. In some localities there is an excess of plant capacity, shown by the fact that the plants are not running full time, or anything like full time. Little complaint from individual producers has been made that freight rates are too high, but in one locality the producers thought that rates unduly favored another locality.

As to the need of the industry, a few producers thought that it might be well if a separate branch of the National Sand and Gravel Association could be formed, as that would perhaps give the benefits of organization at least cost (and considerably quicker) than the formation of an independent organization would permit.

Producers Make Money from Specialties

It must not be thought from the foregoing that, because the industry as a whole, is somewhat disorganized no individual producers are making money. On the contrary some of them had fairly prosperous years and have improved and added to their plants. But these are companies who are most advantageously placed or who have put themselves beyond the reach of the most troublesome kind of competition by making specialties. Certain branches of the silica industry seem better placed than others notably ground silica.

One of the companies that makes a number of special products and finds no difficulty in marketing them at a good price in the Columbia Silica Co. of Akron, Ohio. It quarries a silica conglomerate and makes 15 sized products ranging from dust size to washed gravel. Among its products may be listed special molding and refractory sands, blast sands in several sizes special plastering and finishing sands, fillers for soap washing compounds and other chemical products filter sands, filter gravels and fine and coarse concrete aggregates. Both "green" and dried sand is sold, but all material is washed.

This plant added a number of improvements to both plant and quarry equipment in 1927 and a detailed description was published in *ROCK PRODUCTS* for October 1.

Another new Ohio plant is that of the Central Silica Co., acquired a few years ago by the Ayres Mineral Co., Zanesville, Ohio. The plant is at Glass Rock, Ohio. A detailed description was published quite recently. (Nov. 12 issue of *ROCK PRODUCTS*.)

The plant is modern in every respect, employing chaser mills and screw washers. The special feature is the pulverizing department in which a 7 ft. by 8 ft. conical mill is employed in connection with an air separator.

The Ayres Mineral Co. has nine mills from which it produces more than 30 grades of molding sand. The Central Silica Co. specialized on glass, core, furnace and settling sands and on its pulverized silica for the foundry and ceramic trade. All Ayres products are certified and guaranteed to meet definite physical and chemical qualifications.

In the Ottawa, Ill., district, an important new plant was built by the United States Silica Co. Its flow sheet and methods do not differ radically from those of the other plants of the district, but many refinements have been introduced in the design and operation. As a description of this plant is to be published shortly it will not be further described here.

Notes on Other Operations

A consolidation that includes a number of the largest producers of silica sand, especially glass sand of the highest grade was announced in July, 1927. It included the Pennsylvania Glass Sand Corp., the Berkeley Glass Sand Co., E. F. Millard Sand Works, Pittsburg White Sand Co. and

Maryland Glass Sand Co. All these operated plants in Pennsylvania and in the Berkeley Springs-Hancock district in West Virginia and Maryland. The consolidation is known by the name of the company which took over the others—the Pennsylvania Glass Sand Co.

The Southern Silica Milling and Manufacturing Co. of Columbia, S. C., installed a dryer and increased its production at its Summit plant.

The Lake Wiér Silica Products Corp., Ocala, Fla., installed a dredge and made other improvements.

The Washington Silica Co. installed a rotary dryer and other machinery at its plant near Auburn, Wash. Canada Glass Products Co. recently purchased the property and plant of the Silica Sand Co. near Kingston, Ontario. It was recently announced that a large new plant would be erected.

Many incorporations of companies to buy or develop silica deposits were reported during the year, but letters to these companies have not shown them to have passed the incorporation stage or have been left unanswered.

The Standard Silica Co., Ottawa, Ill., is to build a new pulverizing plant.

Following are the opinions of some producers on current phases of the industry:

Disorganized Condition of the Industry

There is a lack of common sense among producers.

* * *

The industry is disorganized because of 30% overproduction.

* * *

The industry is disorganized by cheap competition, extremely low prices and lack of confidence among producers in the — field.

* * *

Very much disorganized from a lack of confidence, lack of standard cost accounting and (consequently) ruinous competition.

* * *

The current year has been a buyers' market, with the incident price slashing always attendant.

* * *

The industry is decidedly disorganized.

* * *

I cannot see that the industry is disorganized *in toto*.

Effect of Importations

Detrimental.

* * *

Does not particularly affect Illinois producers.

* * *

We do not believe that importation of either glass or silica has hurt our district very much.

* * *

Outside of the importation of pebbles and mill linings we have found the effect of importations to be inconsequential.

It must be affecting the trade in general adversely.

* * *

It affects the market for high-grade silica for chemical purposes.

* * *

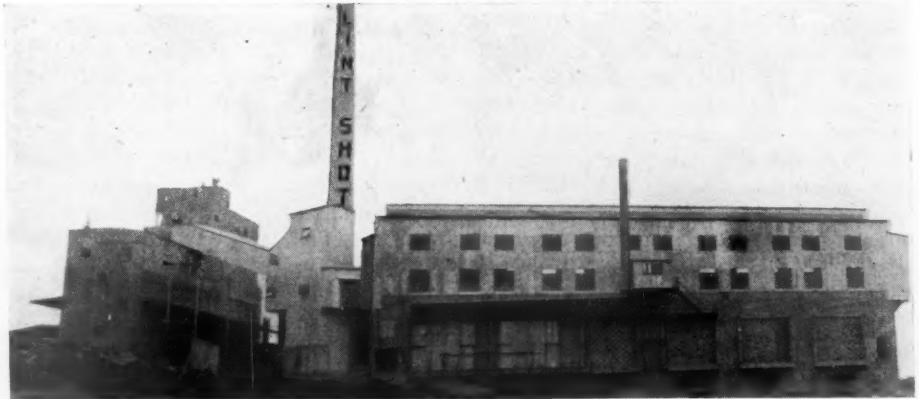
The effect is demoralizing.

* * *

Bad for domestic industries.

* * *

Importation of Belgian sand to West coast points has practically displaced domestic sand. This is equally true of eastern Canada.



Plant of United States Silica Co., Ottawa, Ill., built in 1927

Since 1921, when the first ship load of Belgian sand entered the port of San Francisco, our receipts of sand from Illinois have decreased; for the glass industry they have ceased entirely. This is also true of the same industry in southern California.

* * *

A National Association

We believe it is time to have such an association, for the reason that it is better to co-operate than to fight each other.—*Illinois*.

* * *

We do not see the advantage of a national association. Co-operation among local producers is needed.—*Illinois*.

* * *

The time has been ripe for quite a number of years and now it is "better late than never." Feelings of animosity and distrust must be overcome before an association is established.—*Illinois*.

* * *

The time is not ripe for a national association. We believe that local associations in the different districts should first be on a substantial basis.—*Ohio*.

* * *

We need a national association, particularly for research purposes.—*Pennsylvania*.

* * *

Judging from local conditions, we think the time is not ripe for a national association.—*Pennsylvania*.

Now is the time for a national association.—*Pennsylvania*.

* * *

The time has been ripe for some years to bring about a condition that will permit the marketing of American glass sand on the Pacific coast in competition with foreign silica sand.—*Illinois*.

What the Industry Needs

Horse-sense!

* * *

The greatest need of the silica industry in this district is a complete consolidation or merger. This could be accomplished by

appraisal of all properties, a parent company being formed and stock issued to all property owners and producers to the amount specified by the appraisal. Or there could be a complete purchase of the entire district by outside capital. A national association would help considerably, but either of the above forms of consolidation would give better results.

* * *

Formation of local associations; establishment through them of standard cost accounting, production of a uniform product and the formation of a national association of which all local associations are members.

* * *

Have a law passed prohibiting the use of the words "Silica," "Silix" or "Flint" on any product such as "sand-whiting" or various earths with a low silica content, unless the analysis is plainly marked on the box, and not even then if the SiO₂ content is less than 90%.

* * *

The greatest need of the industry is to create standards.

* * *

Meeting together and getting acquainted.

* * *

(1) Organization, (2) Research, (3) Publicity. Organization of the industry is logically the first step. Individual effort counts for but little as it is now directed.

* * *

Let the situation remain as it is. The quicker it becomes more acute, the quicker the adjustment.

Feldspar and Mica in 1927

PRODUCTION of crude feldspar in 1927 was about 10% under 1926, judging from direct reports from several of the large producers located in North Carolina, Connecticut and South Dakota. Last year, 1926, was one of the best years ever experienced in the industry, production rising to a new high mark of 209,600 tons and the selling price was satisfactory. Good business was looked for this year, but did not materialize, demand falling off from the ceramic industry, the largest customer for ground feldspar. Prices for crude feldspar in 1927 did not change appreciably but a marked decrease in the ground spar was noted, brought about by the weak market condition. Indications point to a better year for producers in 1928.

Competition from Foreign Spar

Feldspar is another rock product which has to compete with foreign imports. The grinders are usually not producers, thus they secure the rock at the best price they can, often at such prices that domestic producers are hard pressed to meet, freight rates considered. For example, Canadian crude feldspar comes in duty free and sells for as low as \$5.00 per ton, whereas the average price of domestic crude is about \$7.50. The average price received for crude at North Carolina mines is about \$6.25 per ton, but mining conditions are better there than at other producing states. Moreover, some grinding mills are located in North Carolina and along the Atlantic seaboard, whereas the South Dakota producer, for example, has a high freight rate to market which must be partly absorbed in his f. o. b. price if he is to successfully compete with imported spar. One mine in South Dakota gets about \$6.00 per ton, f. o. b. plant, and ships to a Murphysboro, Ill. grinding mill, the freight being \$6.50 per ton. With conditions such as these, producers in the western United States are asking a tariff of from \$3 to \$4 on crude and the retention of the present tariff on the ground spar. Keen competition among producers in the North Carolina district has kept prices down too low to make operations very profitable and to leave much of any reserve for expansion or new development, although production throughout the year was good.

Accurate Grading Needed

For many years the feldspar industry drifted along without any regular or systematic method of grading the product for ceramic uses. The manufacture of ceramic ware used the kind of spar which he thought would duplicate products made with earlier shipments from the same mill and was often disappointed, for no two shipments contained identical chemical constituents—the makeup of spar being so variable. Then chemists tackled the problem and facts began to take the place of guesswork. Grinding mills began to blend

the products to suit the requirements of different manufacturers and deposits were analyzed and careful record made of their analyses. But still there was no definite grading of spar, nothing tangible which could be applied to spar from anywhere for any purpose. And this has not yet been remedied, producers recognize the importance of a standard grading, yet are loath to get together and make it an accomplished fact. There is little doubt in the minds of many, that the entire industry would benefit by such a procedure and would be advanced. Steps have been taken by several large producers along this line and more are expected to follow suit and as one producer remarks, "Such a move has been started and will gain favor as soon as business conditions improve."

Another problem awaiting solution is the economic disposal of the large amounts of second grade feldspar containing mica and quartz produced at all reliable mining operations. The Bureau of Standards has been asked to make a scientific investigation to determine new uses for the material, which at the present time is an absolute loss.

The feldspar field is so closely allied with the ceramic industry that its future seems to rest entirely with the development of ceramics. New fields are constantly being opened in ceramics, thus widening the feldspar market. The producer should help the cause along by seeking out the qualities in feldspar and presenting them to its users.

In this way many improper results credited to poor feldspar can be corrected, especially as it often happens that the spar is of good quality but of the wrong chemical constitution for the particular product.

New Developments

A new company has entered production in South Dakota and is reported to be working the Dakota Feldspar Co.'s property and the Trick mines near Pringle on a royalty basis. The Dakota Feldspar Co. mine is to be equipped with modern equipment to increase production. The Keystone Feldspar and Chemical Co. has increased its production to two cars a week. A new grinding mill, 55x76 ft., to cost \$20,000, by the Western Feldspar Milling Co., Denver, Colo., electrification of the Golding-Keene Co. mines at Keene, N. H., and two mills, one at Trenton, N. J., and the other at Spruce Pine, N. C., by the Golding Sons Co., Trenton, N. J., are included in the year's activities. The Adirondack Feldspar Co. has acquired additional properties in Connecticut which will be improved and enlarged some time in 1928. A new company, comprising J. F. Shinn, Norwood, N. C., J. L. Hyatt, Burnsville, N. C., and others, is reported to have acquired about 3,000 acres in the vicinity of Bowditch, N. C., on which there will be erected a feldspar milling and

grinding plant of 150-ton per day initial production, to cost about \$400,000, including equipment. Rudolph Glatly, formerly superintendent of the North State Feldspar Co., Micaville, N. Y., is to be general superintendent and technical expert.

Mica

New Hampshire and North Carolina were the principal producers of mica in 1927, the combined total of these states constituting about 95% of all the uncut mica mined and sold in the United States. The total quantity of uncut sheet mica sold by producers in 1927 was probably about 10% more in quantity and 13% more in value. The scrap mica sales decreased about 25% in quantity and 20% in value in 1927. These estimates are based on study of conditions in the producing areas. The principal reason for the continuing decline of scrap mica is directly traceable to a poor market for the product, which has caused the producers to mine only those portions of their deposits which will give the greatest quantity of clear mica on trimming. Further, mining operations are generally small with crude equipment, the work being carried on at intermittent periods at which time the most profitable parts are worked. Higher cost of labor and increased freight rates hinder the development of other deposits in the United States. In 1927 as in other years, the imports exceeded the domestic production.

Electrical Industries Large Mica Users

The electrical industry was the chief user of mica and is expected to increase its demand for sheet mica and splittings when many projected developments are brought to the production stage. The losses from decreased use of mica for lamp chimneys, stove windows and phonograph diaphragms has been partly made up by a new market, the radio industry, which uses large quantities of the smaller sizes of sheet mica in the manufacture of condensers, head phones and loud speakers.

The market for ground mica is constantly increasing and offers a profitable method of using up scrap mica and other mica not suitable for sheets or splitting. The ground product is used in the preparation of rolled roofing as a dusting material between sheets, in wall paper manufacture, special paints, as a lubricant, rubber filler and as a facing for cement products. Its comparatively high price has been a deterring factor for other uses but future economies in its manufacture and consequent lower price are expected to remove this barrier. There is every indication to believe that the new deflocculating method for recovery of much fine mica hitherto lost in the wet grinding will be of great value to producers and help cut the production costs. This method was developed at the Bureau of Mines and is said to have proven quite satisfactory. The efficient utilization of scrap mica for ground

mica may result in the operation of mines for scrap alone or others in which the grade is not good enough for sheet mica.

Several new incorporations, totalling \$350,000, were reported in 1927, but it is doubtful whether any of the companies engaged in active operation. Mica properties near Franklin, N. C., were acquired by the General Mica and Clay Co., Atlanta, Ga., which is planning development of the mines and the erection of a trimming plant to cost \$85,000 with equipment. The deposits near, Troy, Idaho, inactive since 1914, are being reopened by the Muscovite Mica Co. A 600-ft. crosscut toward the deposit at a depth of about 200 ft. below the old workings is being driven. The new tunnel is expected to develop about 5,000 tons of mica, of which approximately 12% will be available for sheet mica. Vermiculite, a form of mica, is being marketed for insulation and refractory purposes under the trade name of Zonolite by the Zonolite Co. of Libby, Mont.

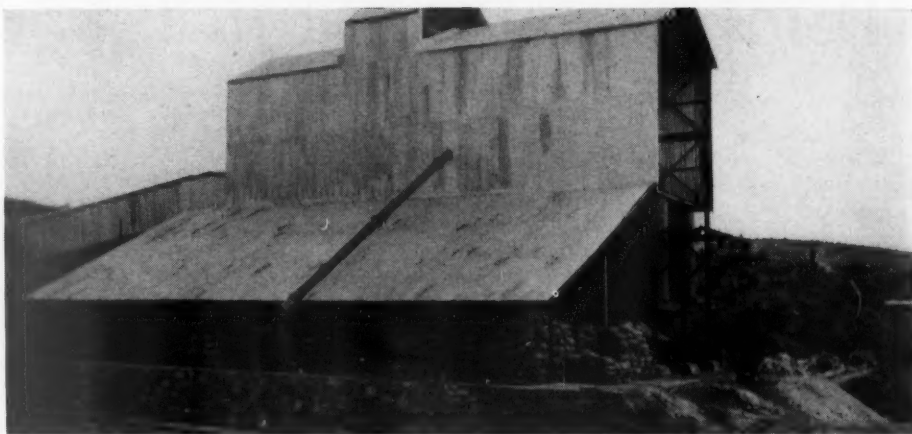
Micolithic Company Completes New Plant

During 1927 the Micolithic Co. of Houston, Tex., completed its initial crushing unit. The original gasoline equipment has been supplanted by a Diesel power plant making possible the electrification of the entire milling, screening and sacking operation. Tram lines have been completed up Canyon No. 2. The quarries in this canyon are furnishing some eight or ten of the company's standard materials, including various colored spars, quartz, mica schists and black and white micas. The company has completed and is operating the Rio Grande, Micolithic and Northern Ry., a standard gage railroad line operating under I. C. C. permit and used as a transportation medium between the Micolithic properties and Mica, the junction point with the Southern Pacific Railroad six and one-half miles to the north.

The company has also built a modern plastic products plant at San Antonio, Texas, utilizing its unusual variety of aggregates in exterior stucco, interior plaster, prepared floorings, granite facings, mortar colors and other building specialties. This plant is now shipping its first carload orders.

A plant of large capacity for the making of refractories is planned for a site already acquired by the company in Houston, Texas. The success of a number of its materials as refractories has been so pronounced that the initial facilities for their making has proven inadequate. The line of plastic refractories now being marketed will be supplemented by brick, tile and other manufactured shapes. The properties of the company contain considerable mica and equipment is now being installed to both wet and dry grind this product.

The General Holding Co., Edmonton, Alberta, is said to have completed development of deposits of muscovite mica near Fort Graham, B. C., and is now in commercial production.



Plant of the Micolithic Co., Houston, Tex.

Talc Enjoys Prosperous Year

THE optimism expressed by talc producers late in 1926 over the prospects for a better year in 1927 appears to have been justified, production being higher and prices better. Large increases are reported from New York and California, and other producing states with the exception of Vermont showed an appreciable gain. Production in Vermont was about 3% less than in 1926 and prices slightly under those received last year, but the producers seem satisfied, for the demand was fairly steady—a decided contrast to the conditions prevalent in the last few years.

Talc is so closely bound up with its consuming industries and these so varied that it is difficult to determine the conditions promoting increased demand for the product. In general, most of the increased production was due to the paper, rubber, paint, roofing and ceramic industries. Some new uses for talc were developed during the year, the important ones being described further along on these pages.

A number of producers completed improvements in 1927, principally by installation of modern grinding and conveying equipment. The Harford Talc Co., Baltimore, Md., installed a new cableway unit, 3000 ft. long, and the necessary cable and steam hoist to operate it. This is the second unit of this type at the plant, one of similar length being installed just previous to the new installation. The Blue Ridge Talc Co., Inc., Henry, Va., increased its plant capacity through installation of a new Jeffrey hammer mill and at the same time electrified its entire operation, installing individual motors to drive the equipment. The recently equipped plant of the United Crayon and Talc Co., Inc., at Glendon, N. C., partly destroyed by fire in the latter part of the year, is being rebuilt and is expected to be ready for operation early in 1928. New equipment to be installed includes a complete cableway unit, a gas or oil engine for power, air compressors, mine elevators and screens. Previous to the fire the company had just in-

stalled a new Raymond high side mill for fine grinding the talc. The Ganim Mining Co. is reported to have plans under way for replacement of its talc mill near Redding, Calif., recently damaged by fire. The company has also leased its talc deposit to a San Francisco, Calif., firm which will operate on a royalty basis.

Projected Operations

Several new projects are expected to materialize in 1928. The Tri-State Talc and Mineral Corp., Glen Gandner, N. J., incorporated for \$150,000, is reported to have acquired some proved talc deposits which will be developed in the spring of 1928. Deposits of talc and soapstone near Clifton, Va., have been purchased by the Old Dominion Soapstone Co., Baltimore, Md., who will recondition and operate the plant on the property.

The North Carolina industry is expected to increase following the purchase of the Standard Mineral Co., Hemp, N. C., by R. T. Vanderbilt Co., the latter company planning on increasing the output by installing additional equipment. These talc deposits are mined for pyrophyllite, a variety of talc of which there are few large commercial areas. A new company, the El Dorado Talc and Rock Products Co., is planning the development of deposits at Placerville, Calif., and will erect a grinding mill. The Bagby, Calif., deposits, it is reported, will be exploited by an eastern group.

The Quebec, Canada, deposits of talc are similar in composition to those in Vermont and have been worked for a number of years by several concerns. Since the imposition of the Fordney tariff considerable amounts are shipped to European countries. One new project, a new grinding plant at Robertsonville, Que., is reported.

The producers suffer greatly from lack of standards for talc to fit certain uses and are generally agreed that some definite limits set by the consuming industries for their

talc as, for example, the amount of oil absorbed by a talc for paint, etc., would be of the greatest assistance. So far, any attempts to bring out consistent specifications have not met with little success, in fact in some cases discouraged, each consumer preferring to have his own. An association of talc producers could, in the opinion of many producers, create such specifications which would meet the approval of consumer and producer alike and also stimulate the industry by research into new uses. But the majority of the producers, the men of small tonnage, are in no position to bear their financial share of carrying on such an association.

One large New York producer, the W. H. Loomis Talc Corp., Gouverneur, N. Y., has, as in the past, been the principal experimenter in talc. The report of W. L. Caten, vice-president of the company given below, is typical of the progress this company has made in its research:

"We have experienced a rather interesting year in that we have shown a very sizable increase, necessitating the installation of a new unit in one of our mills, and have undertaken an extensive core drilling campaign on a new piece of property which we recently acquired. We hope to have this new mine open for operation sometime in the middle of 1928. We are building an addition to our No. 2 mill which when completed will allow for storage of approximately 2500 tons of finished stock. This addition is being constructed of steel.

"Our research laboratory has made some very interesting discoveries for new uses of our particular short fibre talc and we are now busily engaged in attacking these markets for the purpose of enlarging them. It may be of interest to you to know that our particular stock has been approved by the United States Bureau of Commerce (Bureau of Mines) for dusting purposes in soft coal mines. We feel that our progress to a very large degree is due to our experimental laboratory which has become an indispensable part of our organization and as our business grows this division of our organization must also grow.

"We have just completed a new office building which has been constructed entirely of talc and talc products. By this we mean our outside stucco is of talc; talc was used in all the concrete foundations and floors; our plastering is of talc; the chimney is made from crude talc rock; the fireplace is all faced with pebbled, dashed brick made from talc; sidewalks, pillars, etc., in connection with our construction all containing a large amount of talc. The rubber flooring in the building, we understand, contains a percentage of our talc. This building was constructed largely upon reports received from our laboratory prior to construction of the building and the results seemed to bear out our theories in connection with the use of our particular stock."

Of course every talc producer cannot conduct research on so great a scale as the

Loomis company, but the above is given as a fine example of constructive development—the company having been able to expand

its production over 50% in a single year, all through a widened market, directly resulting from the work of the laboratory.

Magnesite and Other Rock Products

Magnesite

THE MAGNESITE producers' long fight for an increased duty on crude and magnesite was ended on November 10 when President Coolidge invoked the flexible provisions of the tariff act of 1922 to raise duties 50% on both products. The new tariff now is \$18.75 per ton of calcined and \$9.37½ per ton on crude magnesite, by which the producers hope to regain the Eastern markets which had been lost to them. Next year should see a revival of the American magnesite industry and more of the plants on a capacity basis because of the tariff revision.

Conditions in the magnesite industry in 1927 continued to be as poor as ever; many of the plants were shut down and what few operated did so on a small capacity basis. The market was there but the producers could not hope to compete with the low-priced products of Greece and British India; the foreign business developing by reason of cheap labor production. All the production of Washington state was from the mines of the Northwest Magnesite Co., which operated only two of its kilns part of the time during the year. The American Magnesite Co. developed maximum production of about 15 tons per day from its mines at Magnesium, Calif., but this was all converted to magnesium products, such as epsom salts, glauber salts and others at the Washington refining plant. The Universal Magnesite Co., Escanaba, Mich., enlarged its plant and the Norristown Magnesite and Asbestos Co. is now planning a new factory and warehouse at Norristown, Penn., to cost about \$100,000.

One new company was incorporated, the Magnesite and Gypsum Products Corp., Little Ferry, N. J., from which further developments are expected.

Asbestos

The new asbestos products plant of the Asbestos Shingle, Slate and Sheathing Co. operated on a capacity basis almost the whole of 1927. The company brought out a new type of asbestos-cement shingle, rough-surfaced and in a variety of colors. The National Asbestos Co., incorporated for \$150,000 at Plumbtree, N. C., is reported to be contemplating the erection of a \$65,000 plant at Minneapolis, N. C. The projected plant is to have a daily capacity of 30 tons, using raw material from deposits about three miles from its location. A new asbestos products plant at Nashua, N. H., the property of the Johns-Manville Co., is reported to be ready to start producing. The Hold-Tite Manufacturing Co. is now operating its new asbestos products plant at Tarrant City, Ala.

The Beaver Products Co. are building a new plant at Buffalo, N. Y., for the manufacture of asbestos-cement products, including shingles. The Rubberoid Co. has a plant under construction at Joliet, Ill., which will make asbestos-cement products by the Komnick process.

The Asbestos Mining and Manufacturing Co., Hollywood, Ga., was purchased by Abb Landis and is now being operated under the name of the Hollywood Asbestos Mines. A new mining operation at Oakdale, Calif., was reported, the entire output going to the Asbestos Products Co. of Oakdale.

Asbestos Corp., Ltd., Quebec, Can., is extending mine and plant improvement at its different properties. Two additional cableways are being installed at the King pit and a complete change of machinery and manufacturing methods at the Vimy Ridge plant is under way. The Beaver pit and the Consolidated Mining Co.'s pit in the Thetford, Quebec, area, are being joined and a



American Bentonite Co.'s plant near Anniston, Ala.



Looking down into the bentonite pit, American Bentonite Co., Eastaboga, Ala.

new, modern mill large enough to handle the output of both mines is to be erected. The improvements are estimated to cost from \$1,500,000 to \$2,000,000. The company is also experimenting with waste asbestos for use in agriculture.

Fuller's Earth, Tripoli, Diatomaceous Earth and Bentonite

The great increase in lubrication production is reflected by further development of the fuller's earth industry, large amounts of that mineral being used in the treatment of lubricating oils. A new 30-ton per day plant was built near Riverside, Tex., by the Texas Co., large producers of lubricating oils, for its own supply of fuller's earth. This was described in *ROCK PRODUCTS*, November 26. Another Texas project, according to reports, is the near development of deposits at Burnham, Tex., by the Bennett-Christiansen Co., South Bend, Ind. A new Florida company, the Superior Earth Co., has been incorporated for \$20,000.

Several new companies were organized to develop pumicite deposits, recently located in several states. The Alabama Tripoli Corp.

is planning to build a grinding mill at Jacksonville, Ala., for tripoli and a brick plant to make "Tripolex" building brick as a by-product. New pumice deposits are to be worked near Tennant, Calif., and the American Geyserite Corp., Reno, Nev., has sold its holdings to the American Pumice Corp., also of Reno.

The Oxford Tripoli Sales Co., Inc., opened a new plant near Trusro, Nova Scotia, and installed drying equipment and storage sheds. The crude dried tripoli is shipped to the company's grinding and refining plant at Haverstraw, N. Y. The Canada Kieselguhr Co., Ltd., was incorporated for \$50,000 at Toronto, Ont., to engage in the manufacture of kieselguhr, mica, feldspar and other materials. Diatomaceous earth deposits near Digby Neck, N. S., are reported to be under development by the Nova Diatom Products Co.

Bentonite is one of the minerals for which new uses are constantly being found, the most recent being as a bond reviver for used foundry sands. The workable deposits are limited to a few states and are generally small, consequently new deposits of any ex-

tent have considerable value, provided they are not too far from large cities. A good deposit is said to have been recently located near Aberdeen, Miss., the only one of its kind in the state. One new company, the American Bentonite Corp., New York, has been chartered with \$500,000 to exploit and develop bentonite deposits.

The company is operating mines at Eastaboga, Ala., and a plant capable of treating 150 tons per day of bentonite, 14 miles west of Anniston, Ala. The entire production of the plant at present is sold for foundry purposes, but other grades for special purposes will be manufactured later.

Graphite

A new and modern graphite concentrating plant, employing the most advanced type of equipment has replaced the old burned plant of the Southwestern Consolidated Graphite Co., Burnet, Tex. The Superior Flake Graphite Co. are reported to have completed a new treating plant at Chicago. One new Alabama development is under way at Anniston, where the Federal Graphite Co. has acquired 700 acres of graphite land, upon which a new plant of 500 tons per month capacity is to be built. The Alabama-Quenelda Graphite Co. of Birmingham, which owns about 2,000 acres of graphite-bearing lands, four crude graphite mills and a modern refinery and finishing plant, has recently been organized under the laws of Delaware with a capital of \$5,000,000. The company is expecting to begin operations at its Peerless and Carbon Mountain plants early in 1928. These two plants, located in Clay county, Ala., are probably the largest graphite concentration mills in the world, the capacity of the two plants being about 750 tons of ore per day, yielding about 20 tons of graphite concentrates.

The graphite ore is mined by electric shovel from a vein over 700 ft. wide at the point now being worked. The ore veins on the company's properties come to the surface and mining is done from open cuts, there being no underground mining or tunnels, the nature of the operations being that



Panorama view, showing graphite ore deposits of the Alabama-Quenelda Graphite Co., Birmingham, Ala. The electric shovel

of quarrying. The graphite ore consists of a sandstone or mica-schist containing an average of 3% graphite.

A No. 9½ Telsmith breaker is used for primary crushing at the mines, the ore is then conveyed to the Peerless and Carbon Mountain plants by a 24-in. rubber belt conveyor about 900 ft. long. The ore is further crushed at the plants by use of gyratory crushers, rolls, and ball-mill, where the gangue is fed into the separation system. The company uses the "oil flotation" system, both the Callow and Mineral separation systems being used, in conjunction with Wilfley tables and Deister classifiers. The concentrates produced in these plants are hauled by truck to the company's refinery, located in the town of Lineville, Ala. This refinery is reputed to be the largest and the most complete refinery of its kind in the world. The concentrates are treated in the refinery and are then classed according to grade and tested in the company's chemical laboratory, from where the finished product goes to the warehouse preparatory to being shipped.

The holdings and properties of the Alabama-Quenelda Graphite Co. are considered to be among the largest and richest deposits in the graphite district of Alabama, these deposits being reported on by engineers to have over 80,000,000 tons of available ore. Extensive improvements have been conducted by the company during the past year and in addition to the operation of these two units the company plans to operate its other two concentration plants soon.

Fluorspar

The fluorspar industry is one which is dependent greatly on the production of iron and steel and only when these two latter industries are working on a good basis can the spar industry expect a good business. The industry accumulated large stocks during the boom years in the steel industry, which have not been entirely disposed of yet and have exerted a depressing influence on the market and indirectly led to decreased production at the mines. Producers have been asking for a higher tariff on fluorspar

to enable them to meet competition from imported spar which has literally shut out the Illinois-Kentucky mines from the markets east of Pittsburgh. Whether there will be a fluorspar industry of any importance in the United States depends on tariff protection.

The fluorite minerals are such that no artificial markets can be created for them. A possible expansion lies in the introduction of ground fluorspar as a raw cement admixture to lower the clinkering temperature. The cement industry could use spar containing from 5 to 10% of silica or material not suitable for the iron and steel trades. A large amount of this low grade spar is produced at the mines in getting out the high grade for flux.

Rock Asphalt and Amiesite

Thirteen new rock asphalt incorporations with an aggregate capitalization of \$18,564,000 were recorded in Rock Products in 1927. Not all of this represents actual invested capital, however, for included in this total are several large increases of capital by concerns organized prior to 1927.

Production increased over 1926 and prices were somewhat less, but satisfactory. Good business is looked for in 1928; several of the producers already have large contracts which are expected to keep them busy almost the whole of next year.

Increased activity was noted in the rock asphalt industry in 1927, several of the new companies starting operations and many of the older producers expanding their plants. The first large shipment of Alabama rock asphalt ever made to the state of New York was forwarded in September. The total shipment of 1500 tons will be used for road construction near Bear Mountain, N. Y.

Early in the year several of the producers in Kentucky and Alabama, of which the Rock Asphalt Co. of America was the largest, consolidated their holdings and interests to form a new corporation called the United Rock Asphalt Corp., with headquarters at Louisville, Ky. Another event of interest was the purchase of the Niagara Stone Products Co., Bellefontaine, Ohio, by the

Standard Asphalt Corp., Cleveland, Ohio, which also operates asphalt block plants in several other states. The Cuban Rock Asphalt Co., a new company, is planning the establishment of rock asphalt treating plants at several gulf ports, including New Orleans, La., using rock asphalt from its Cuban quarries.

The Amiesite Asphalt Co. of Ohio, Inc., acquired new quarries at Mimms, Tenn., and are planning to build a \$75,000 plant, equipped to produce about 400 tons of amiesite asphalt per day. A new crushing and distributing plant at Little Rock, Ark., is projected by the Amiesite Asphalt Co. of

The Uvalde Rock Asphalt Co., Houston, Tex., is reported to be building a new plant, and the Kentucky Rock Asphalt Co. is installing machinery at a new quarry property to increase production in 1928.

New Enterprises in 1927

THE summary below is taken from new incorporation notices published in Rock Products during 1927. It is probably not quite complete, nor are all of the projects alive; it merely is offered to give our readers some idea of the 1927 activities.

NEW CAPITAL INVESTED IN ROCK PRODUCTS INDUSTRIES IN 1927

Industry	No. of new incorns.	Incorporated capital
Cement	10	\$ 64,037,000
Sand and Gravel.....	167	15,673,000
Crushed Stone.....	76	8,147,000
Limestone and Marble...	11	3,395,000
Granite	5	295,000
Lime	22	1,010,000
Rock Phosphate.....	2	1,000,000
Slag	1	200,000
Feldspar	4	600,000
Mica	3	350,000
Talc	1	100,000
Magnesite	2	150,000
Bentonite	1	500,000
Asbestos	1	150,000
Rock Asphalt	13	18,564,000
Cement Products	128	10,878,250
Miscellaneous	22	1,545,000
Miscellaneous (no capital value reported).....	55	
Total	520	\$126,591,000



operations, crusher, and conveyor system to Peerless plant on the right and Carbon Mountain plant, just over the top of the hill

Rock Phosphate Improves in 1927

Spring Floods Delay Development, but
late Months of Year Bring Good Demand

By James A. Barr

International Agricultural Corporation, Mt. Pleasant, Tenn.

THE OUTLOOK for 1927 was not very good, due to the low price of cotton at the close of the preceding year. The Spring floods did not tend to improve matters at first and many or all of the companies entered the year with rather large inventories of unsold fertilizers and stocks of materials.

Prices of cotton started to improve rap-

conditions are very severe in the Summer and necessitate heavy over-insulation of the lines and high class equipment in general to prevent outages.

The Florida pebble deposits are of the blanket type overlaid by a sandy clay overburden averaging around 25 ft. in depth. This admits economical removal either by

portant, a step in the washing process. The face of the bank is washed down by monitors using water under 150 to 200-lb. pressure. Ditches blasted and washed in the soft marl bed rock carry the blackflow to a mine pump sump. The pumps are generally of 12-in. size, heavy cast iron centrifugal type, direct connected to a 300 to 400-hp., 585 rpm. variable speed motor. A 36-in. dia. impeller is customary with these pumps. The hydraulic water required varies from 3000 to 4000 gpm. The percentage of solids varies from 10 to 20%, handled through pipe lines from 12 to 14 in. in diameter. The mine pumps show a 56% efficiency on clear water which has prompted renewed attempts at improvement without sacrifice of wearing or operating qualities.

The new washers are very substantial affairs constructed of steel as shown in the following illustration. Since the deposit around a washer which can be economically handled lasts only from four to six years, the possibility of moving a steel washer to a new location tends to offset its higher first cost.



Dragline and hydraulic stripping in the Florida land pebble phosphate fields

idly after the first few months and the farm situation in general became more favorable, which, in turn, was soon reflected in the phosphate industry until at the close of the season it was generally conceded that 1927 was a good average year equal to or slightly better than last.

Conditions Unchanged in Florida Pebble District

In the pebble district, which lies south of Lakeland, Fla., and about 30 miles east of Tampa, there has been little change from average conditions or processes of last year. There is a general tendency to increase the efficiencies of the equipment. A few years ago 70 to 72% was considered a good efficiency for centrifugal water pumps, whereas the latest units offered and being installed show 85% along with an increase of 2 to 4% in the synchronous motors used to drive the units. This represents a large annual saving with pumps using from 600 to 1000 hp. each.

Several of the large operators now purchase power from the public service corporations that are rapidly covering the district as well as the state with a network of high-class transmission lines. Lightning

hydraulic methods or by large electric draglines, the larger portion being handled by the former. The following illustration shows both methods being employed in the same pit.

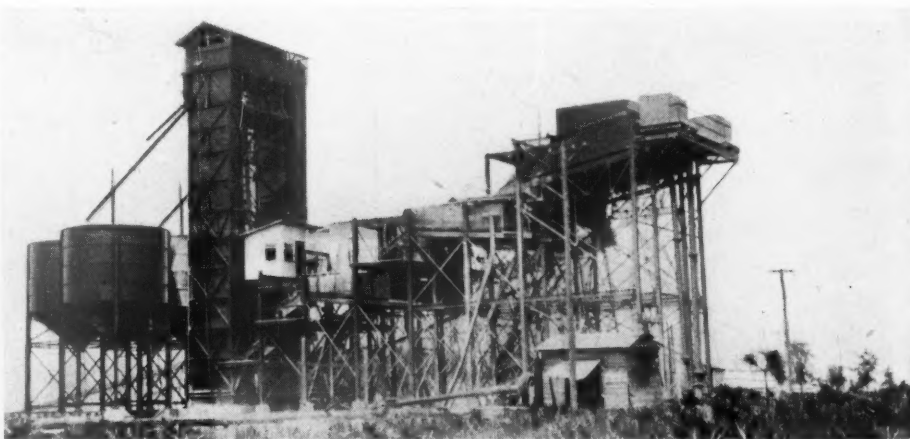
Hydraulic Stripping and Mining

The mining is all done by hydraulics, as this not only serves as a means of removal but of transporting and what is more im-

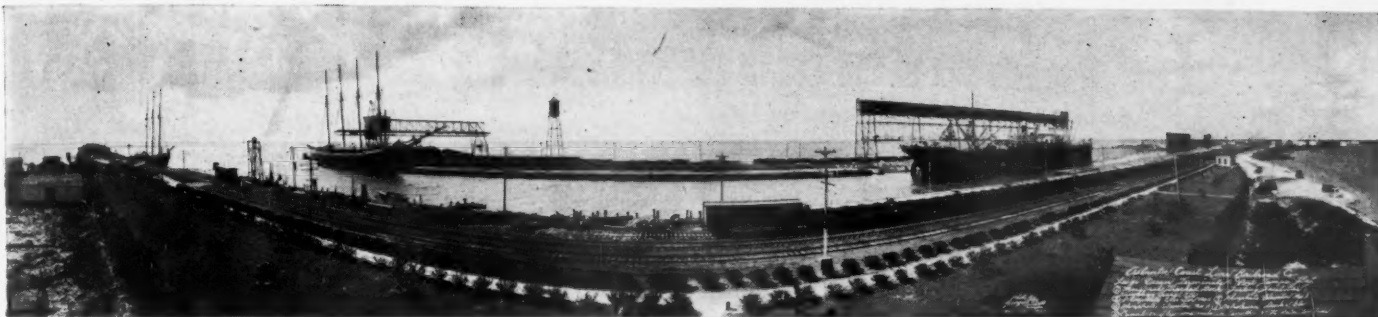
Washing

The washing process consists of dewatering the large volume, incoming from the hydraulic mining operations, by stationary inclined screens pugging in log washers to put the clay in suspension, and separation of the clay and fine silica particles by vibrating or rotary screens.

The wet phosphate recovered by the washers is dried in oil fired, direct heat, counter current, rotary kilns usually 48 in.



One of the new types of steel washing plants in the pebble district



Large ocean terminal at Port Tampa, Fla., from which large amounts of phosphate are handled for export

by 30 ft. in size with capacities from 12 to 20 tons per hour.

When oil prices rose last year, several of the companies were preparing to use powdered coal to replace oil. A trial installation of a unit pulverizer on a rotary dryer was found to be quite successful. The increased production of oil caused a reasonable drop in prices of fuel oil which will be in effect for 1928. It is to be expected, however, that the general trend of oil prices will be upward and powdered coal is destined to again become a factor.

Phosphate for Export Trade

Phosphate for export or domestic coast-wise delivery is shipped through railroad terminals in nearby harbors on the gulf. The phosphate is loaded into covered hopper cars at the mines, hauled to the port by either the A. C. L. or S. A. L., dumped through a track hopper and feeder to an elevating conveyor and spouted into the ship. Sampling is done automatically by cutting the rock stream at regular intervals, followed by successive automatic splittings and crushing, until a convenient portion is spouted into a sample bucket.

There has been little activity in the hard rock field, due to the high cost of production. The output is shipped to Fernandina, Fla., dried in a central plant and shipped through adjacent railroad terminals located on deep water.

Tennessee Conditions

The conditions in Tennessee ran parallel with those as remarked in general in the opening paragraphs. There has been no change in methods in stripping the brown phosphate deposits by draglines and the mining by both draglines and by hand. There is a gradual tendency to mine as much as possible by draglines and use hand labor only to clean up in crevices (cutters) in the limestone floor and around the limestone boulders which often project up into the deposit.

The washing process consists mainly of pugging in log washers or similar agitators to elutriate the clay, followed by separation of the clay by screening the coarser sizes and by classification for the finer sizes, in mechanical or hydraulic classifiers.

The wet phosphates, drained in storage

piles of its excess moisture to 18-20%, is dried in coal fired direct heat rotary dryers to 1% final moisture. The dryers are of larger diameter than those in Florida, being about 66 in. by 40 ft., and in general have a higher heat efficiency.

The problem of drying the minus 100-mesh phosphate is a serious one from a cost standpoint with present apparatus. This is now being investigated and presents a parallel problem of drying the fine anthracite river coal (culm) for use in power plants.

The dried phosphate is stored at ground level, reclaimed by belt conveyors in a tunnel underneath and loaded into box cars by mechanical loaders. Some hand loading is still done.

Fair Year in Blue Rock Phosphate Fields

There has been a fairly good year in the blue rock district. This variety resembles a medium blue limestone and is mined under ground by the well-known room and pillar system adapted to recovering of thin seams of 18 to 30 in. in thickness. The treatment of the blue rock before shipment to factories is only that of crushing and drying.

High grade lump phosphate for the electric and blast furnace trade is becoming scarce and more expensive to mine. This has stimulated interest in possible lump producing properties and blue rock deposits. Considerable prospecting and core drilling is being done.

Phosphoric Acid

One company has located a plant for the production of phosphoric acid by the sulphuric acid method directly at the mine. The phosphoric acid is utilized at the same plant for the manufacture of high grade triple superphosphate and trisodium phosphate.

Active research is being carried on in the production of phosphoric acid by fuel fired furnaces with the idea of avoiding the high cost of electric furnaces which is at present the only successful heat reduction method in use. The work is still in an experimental stage. Previous attempts to use a modified blast furnace were not successful. The idea if finally developed could be used to eliminate the step of washing by smelting the briquetted mine run direct.

Ground Phosphate

The production of ground rock, pulverized to 95-98% through a 100-mesh screen, showed a favorable increase for the year. This is used for direct application to the soil, mostly in Illinois. There were two new grinding mills erected during the year. Air separation is used, as screening is impossible on such fine sizes.

The output from the western fields showed no appreciable increase for the year and is still confined mainly to one company that converts the phosphate into triple superphosphate to avoid freight charges on the long hauls required. Byproduct sulphuric acid is used to effect the conversion into the soluble phosphoric acid. Decantation and filtration followed by evaporation separate the solutions from the residue of gypsum. The concentrated phosphoric acid is mixed again with finely ground rock to convert same into the soluble form. The resulting product is the triple superphosphate of the fertilizer trade.

Plenty of Highway Building Still to Be Done

FROM an anatomical viewpoint the next great road-building task in the opinion of the newly organized committee on highways and motor transports of the Chamber of Commerce of the United States, is to complete the skeleton of highways.

The states, with Federal aid, have made good progress toward building an arterial system of trunk lines, but these constitute only 7% of the entire mileage of the country's roads. The outstanding problem to which the Chamber's committee will give its attention is the development of the secondary road systems. In many cases the lack of adequate administrative machinery and of co-ordination between local units have been the chief obstacles in the way of progress.

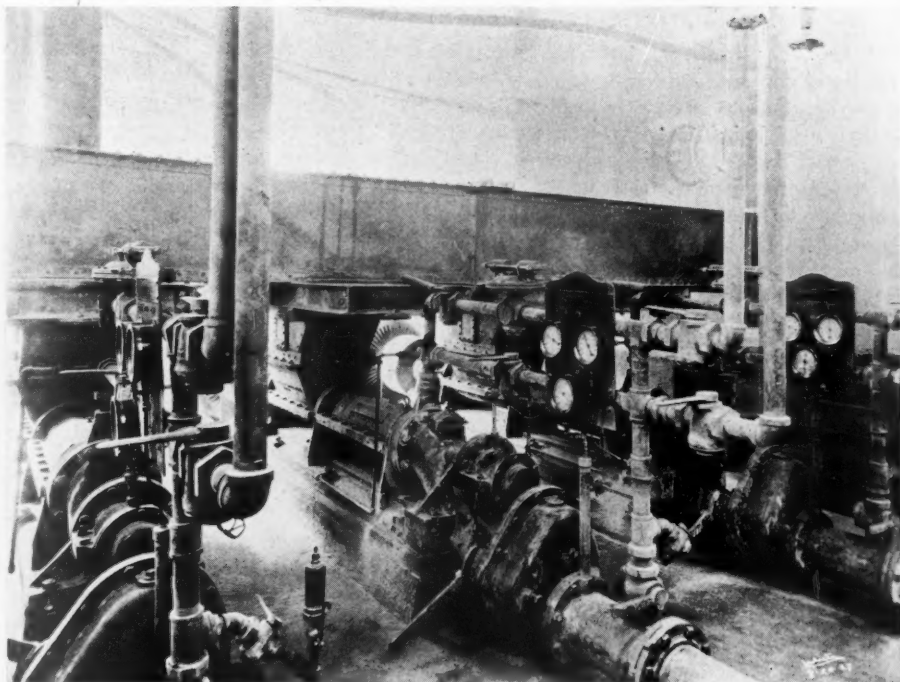
The total highway mileage in the United States is approximately 3,000,000. Of this the Federal aid system comprises 185,000 miles, of which 133,000 have been improved. State highway departments have improved 40,000 or 50,000 miles outside of the Federal aid system and county and local administrations have improved in some measure about 600,000 miles. This leaves more than 2,000,000 unimproved and only partly graded.

New Development in Mixing and Blending Dry Raw Materials for Portland Cement Manufacture

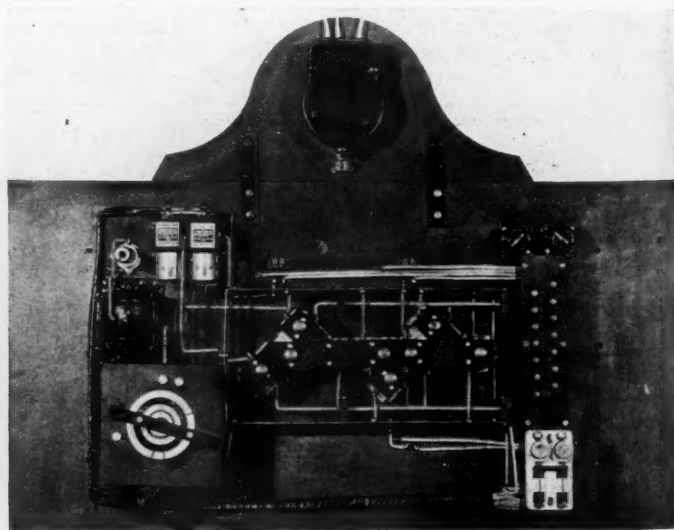
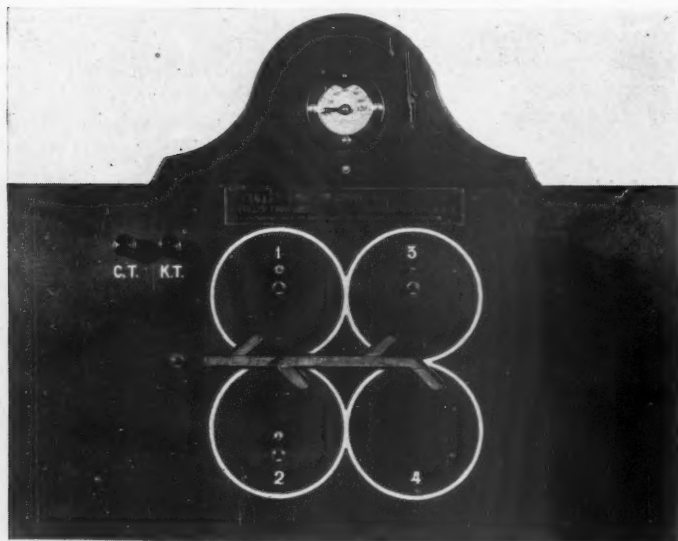
Adaptation of the Fuller-Kinyon Pumping and Conveying System May Re-establish Popularity of Dry-Process Manufacture

PULVERIZED, dry, cement raw materials of varying physical and chemical characteristics are being mixed and blended by means of the Fuller-Kinyon conveying system with very little additional equipment other than that normally required for conveying from finish mills to raw storage and from raw storage to kiln tanks. Due to the ease with which the transport lines can be interconnected, almost any desired combination can be arranged for, making a system equally as well applicable to old as to new plants.

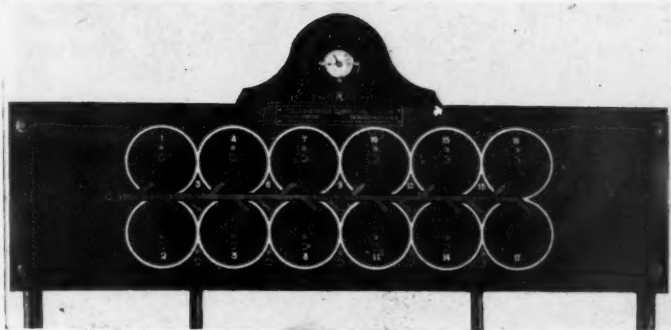
In the first few installations placed in commercial service mixing and blending was accomplished under manual control, that is, manual operation of the diverting valves. The success of these installations in improving the quality of the cement and effecting savings in lost kiln hours by eliminating kiln feed flushing, and by preventing the formation of clinker rings due to improperly mixed feed, as well as the more convenient distribution of the materials led to the development and installation of the automatic time-controlled blending system, which is now being installed in a number of new and old cement plants. The automatic system has substantially eliminated manual



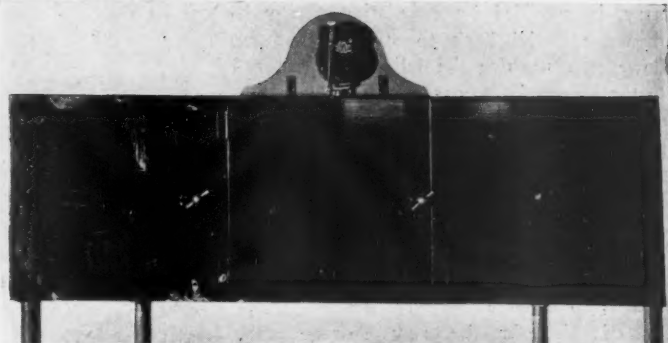
A recent installation of three 10-in. Fuller-Kinyon pumps for blending and conveying cement raw material. The central pump is a spare and is connected to either system. Each pump has an hourly capacity of 275 tons



Left—Front view of four-unit blending panel arranged for time and remote control of the transport line diverting valves. The two bulls-eyes labeled "C. T." and "K. T." indicate whether the material is being re-circulated or delivered to the kiln tanks. The ground glass inserts provide visible indication of flow of material into the various bins. Right—Rear view of four-unit blending panel with casing removed showing the terminal block, time clock and relay system



Front view of 17-unit finish cement blending panel arranged for 17-bin cement storage silos



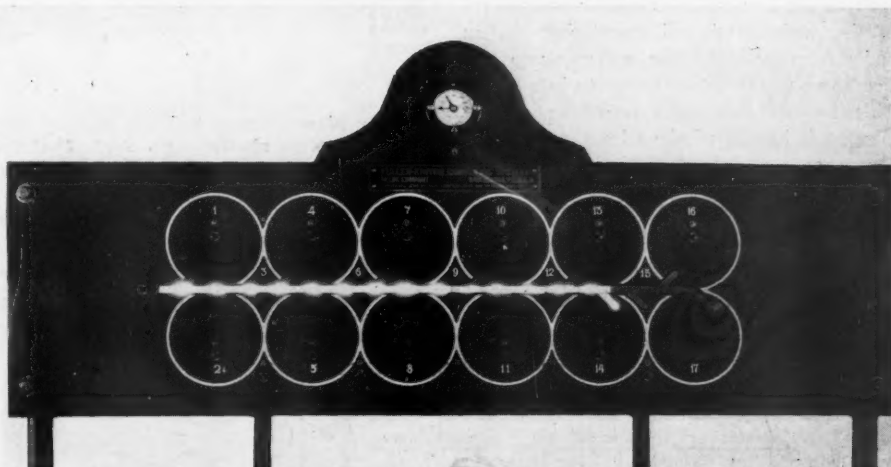
Rear view of finished cement blending panel showing casing and doors

control and placed the entire system and its control under the direct supervision of the plant chemist.

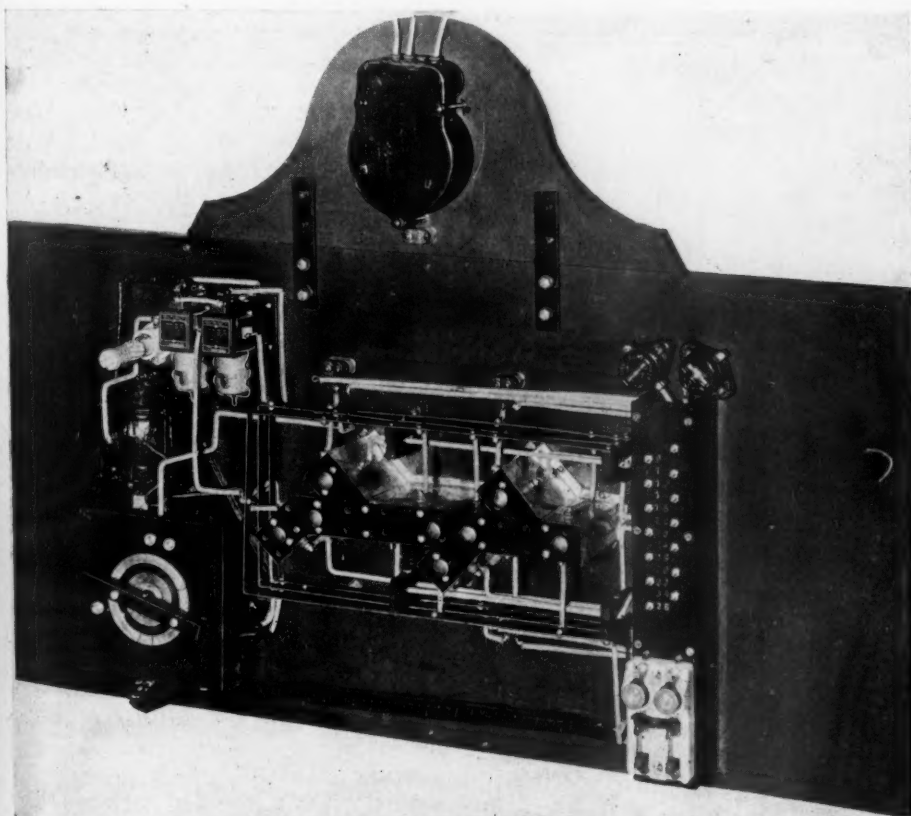
Dry Materials Treated as Liquids

The efficacy of the method is due, in part, to the unique tendency of the material transported by the Fuller-Kinyon system to flow as a liquid. In this state the material does not tend to segregate or classify in the system or at its points of discharge in accordance with differences in fineness or specific gravity of the particles. The material as discharged into a receiving bin or hopper seeks a hydrostatic level and remains in the same relative mixture as when discharged from the tube mill or other source of supply.

Under the system of automatic time control, to be described, the mill stream is discharged into the raw storage bins which



Front view of 17-unit finished cement blending panel arranged for 17-bin cement storage silos. The illuminated line indicates that material is being delivered into bin 14



Another rear perspective view of four-unit control panel with casing removed showing terminal block, time clock and relay mechanism

serve as blending tanks. The raw storage need not be an elaborate structure with a multiplicity of tanks, for one installation having but three raw storage bins of a capacity sufficient to meet the kiln requirements is sufficient to meet all reasonable requirements of correct kiln feed. It is recommended, however, that four bins be provided, when convenient, in order to provide greater flexibility of control for reasons that will be apparent from a perusal of the detailed description of the theory of operation.

The transport line valves, operated under time control, switch the flow of material into one raw storage bin after another for short intervals in order to deposit a thin flat layer of material in each bin. The sequence of filling is continuous and the mill stream is thus divided by the number of raw storage bins in a system. This provides a divisor for the mill stream approaching the number of raw storage bins, and the number of layers in one bin; for as the material is withdrawn the separate layers tend to intermingle immediately throughout the entire height of the material in the bin, due to the "pipes" or "rat holes," formed directly over the withdrawal spouts.

Further mixing is accomplished in collection and distribution. A more thorough mixture and contact, when it becomes neces-

sary, is provided by circulating the withdrawn material back to storage, without, however, disturbing the delivery of material to the kiln tanks. Correction is usually unnecessary but is provided for and made possible by a number of different methods of proportioning and mixing and can likewise be modified by recirculating.

The accompanying line drawing shows an ideal arrangement for mixing, blending and correcting under automatic control with storage in any desired number of bins in the raw storage silo, with means for recirculating for mixing purposes, or for bypassing raw storage and diverting the mill stream immediately to the kiln tanks. Suitable cross-overs in the withdrawal and circulating system make it possible to use either pump for blending or for transportation to kiln tanks. This insures continuous operation of the kilns as it has all of the advantages of duplex storage to kiln conveying systems.

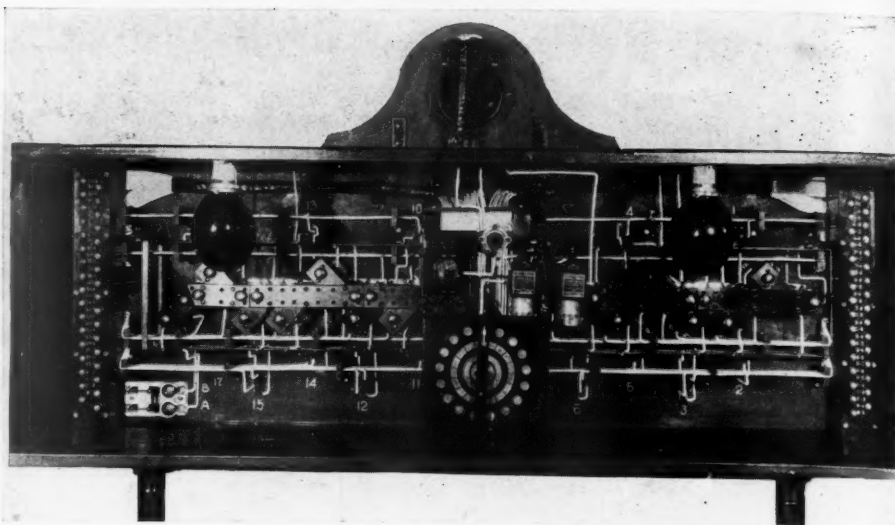
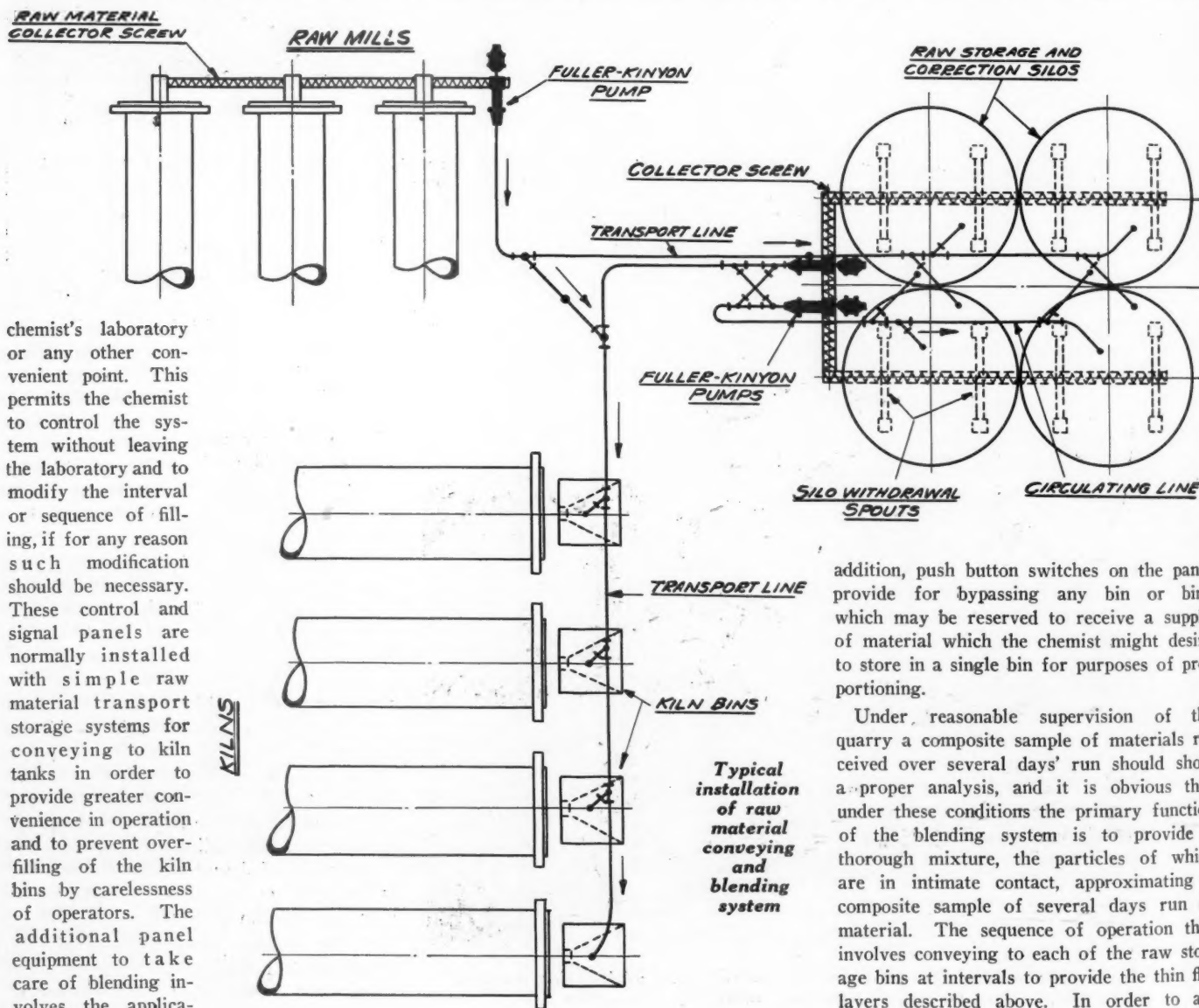
Automatic Control

The automatic and remote control valve operating circuits terminate in a control and signal panel which may be located in the

tion of the time control clock and a suitable relay arrangement.

Thus the system is arranged for automatic operation under time control with a

predetermined interval and sequence, but both the interval and sequence of operation can be modified from the panel itself. In approach a maximum of mixing due to the



Rear view 17-unit finished cement blending panel showing terminal blocks and time control mechanism. Note that the panels are wired complete and that the terminal bars are numbered to correspond with the various valve circuits

chemist's laboratory or any other convenient point. This permits the chemist to control the system without leaving the laboratory and to modify the interval or sequence of filling, if for any reason such modification should be necessary. These control and signal panels are normally installed with simple raw material transport storage systems for conveying to kiln tanks in order to provide greater convenience in operation and to prevent over-filling of the kiln bins by carelessness of operators. The additional panel equipment to take care of blending involves the applica-

addition, push button switches on the panel provide for bypassing any bin or bins which may be reserved to receive a supply of material which the chemist might desire to store in a single bin for purposes of proportioning.

Under reasonable supervision of the quarry a composite sample of materials received over several days' run should show a proper analysis, and it is obvious that under these conditions the primary function of the blending system is to provide a thorough mixture, the particles of which are in intimate contact, approximating a composite sample of several days run of material. The sequence of operation then involves conveying to each of the raw storage bins at intervals to provide the thin flat layers described above. In order to ap-

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proach a maximum of mixing due to the "rat holing" effect, withdrawals from each bin are made from as many spouts as possible discharging into a collector screw or other similar device. As withdrawal is continuous, and filling is intermittent, and as withdrawals are made from a number of points, there is no tendency for incoming material to flow down, or short circuit through, the several "rat holes."

Thus the mill stream error is divided by the number of raw storage bins, the number of thin flat layers in one bin, and if the arrangement is as indicated in the drawing, by the two collector screws which discharge into a screw conveyor above the pump in the transport line leading to the kiln tanks. Further, as the material is delivered in thin flat layers to the kiln tanks the mill stream error is further divided by the number of kiln bins and the number of layers in one kiln bin.

Mill Stream Error Reduced to Small Figure

An estimate of this error divisor calculated from specific conditions at any cement plant is worthy of some interesting speculation, especially if it is remembered that these thin layers need not be more than 3 in. in thickness. Such a calculation, however, would not involve a mixing factor due to recirculating the withdrawn materials back to storage, and it is obvious that almost any degree of mixture can be obtained by thorough circulation. Recirculation has another distinct advantage in making it possible to obtain excellent results with a minimum number of raw storage bins, thus making it unnecessary to provide additional raw storage for blending purposes in most plants and keeping the total cost of blending installation at a low figure.

If for any plant purposes, it is desired to simplify operating conditions and direct the mill stream immediately to the kiln tanks, this may be accomplished by the branch line in the system shown in the drawing, and as the kiln bin valves are operated under the time control system, a fairly good mixture may be obtained. In view of the flexibility and the ease with which the various bins may be bypassed, the system is adaptable to unusual quarry conditions. For example, the mill stream may be directed into a single bin if the material is of unusual analysis and it is desired to keep one bin out of the system for the purposes of proportioning.

If four or more bins are available to serve as blending tanks, a somewhat greater range in flexibility is provided. As an example of this, half of the bins may be cut out of the system temporarily and the remaining number filled as prescribed above. The other bins could then be filled in the same manner and the withdrawals from the two groups of bins could be proportioned if necessary. However, if the system is operated with a reasonably careful supervision of the quarry, correction and propor-

tioning are said to be unnecessary.

In its simplest form, one withdrawal pump may be used in a system having an hourly capacity approximately twice as great as the kiln requirements. A branch line in the transport line leading to the kiln bins is provided to allow for recirculating the material in storage during the intervals between conveyance to the kiln bins. This can be controlled automatically by the level of the material in the kiln bins. The use of a single pump is not as convenient, however, as the arrangement shown in the drawing, which involves the use of two smaller pumps as the large pumps would necessarily have a capacity approximately twice as large as the mill stream. By this latter arrange-

ment the systems can be interconnected and the line leading to the kiln bins may be fed by any one of the three pumps; that is, directly by the finish mill pump and from storage by either withdrawal pump. The storage withdrawal pumps serve interconnected kiln transport lines and interconnected circulating lines. In an emergency either pump can maintain the kiln requirements and under normal conditions one pump will be operated in the recirculating system to complete mixing.

In view of the flexibility of the system similar results can be obtained in a number of layouts to meet specific plant conditions and the line drawing is merely indicative of an ideal arrangement.

Filtration of Cement Slurry Makes Headway in 1927

Filters Demonstrate Greater Output and Lower Fuel Consumption from Wet-Process Cement Kilns

By D. C. Coulson

United Filter Corp., Hazleton, Penn.

TEN KILNS COMPLETELY EQUIPPED with American slurry filters in three cement plants, representing a production of 10,000 bbl. per day, have demonstrated filtration to be a simple, practical and economical method of increasing kiln output and reducing the amount of fuel used per barrel.

One of these installations has been operated two and one-half years and the others through a summer's business.

The first installation, made at the Ford Motor Co.'s cement plant at Fordson, Mich., was described in the December 25, 1926, issue of *ROCK PRODUCTS* in an article entitled "Reducing the Moisture Content of Portland Cement Slurry by Filtration." The results of this plant's operation have been improved during the past year. The 10-ft. x 150-ft. kilns have each produced as much as 1600 bbl. per day. The maximum stack temperature is 1300 deg. F. The fuel consumption averages about 85 lb. of 13,500 B.t.u. coal per barrel of clinker without taking credit for the steam produced in the waste-heat boilers, and includes the heat used to dry the coal.

The Federal Portland Cement Co. at Buffalo, N. Y., is the first plant built to include continuous filters in the original design. In view of the fact that the kilns were to operate on American filter slurry cake, capacity was provided in the raw and finish mills sufficient for a production of 2000 bbl. from each of the 11x175-ft. kilns. This represents a 500-bbl. increase over the usual rating for this size kiln when operating on liquid slurry. The wisdom of the increased

plant rating has been well proved by operation.

One American filter is located above each kiln in a space 10 ft. wide by 9 ft. high by 20 ft. long. The filters are fed by pumping slurry continuously into the bottom and maintaining a slight overflow to take care of mill fluctuations. This upward flow in the American filter tank along with the agitation supplied by the rotating discs effectively prevents slurry from settling in the filter.

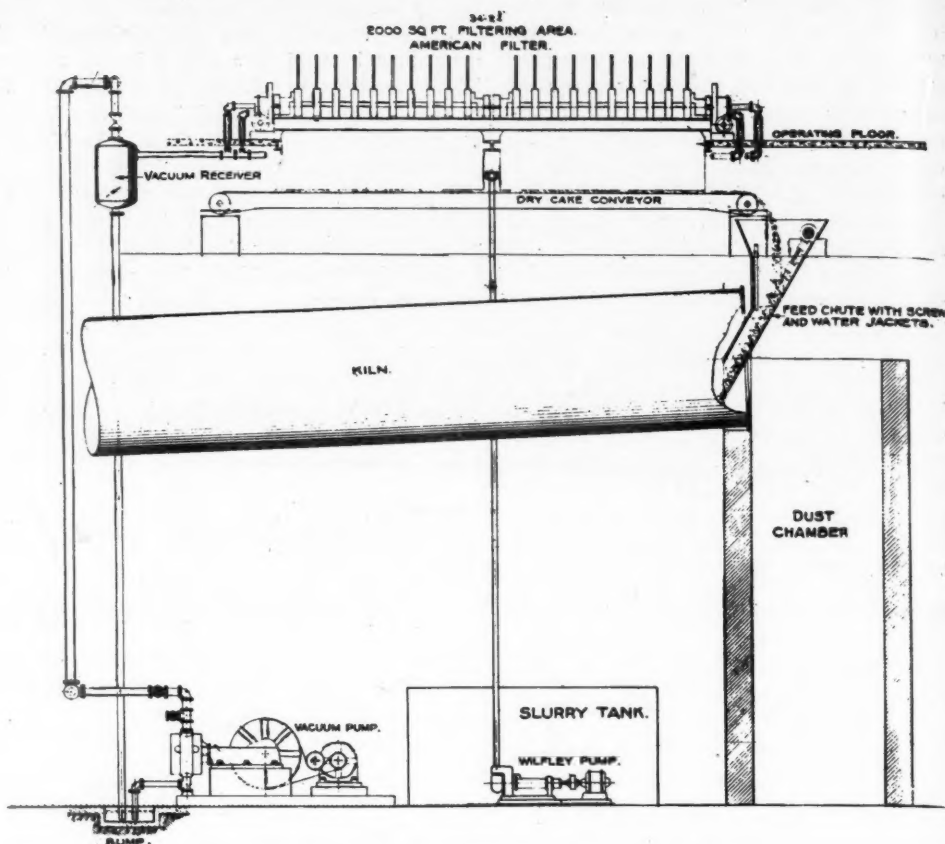
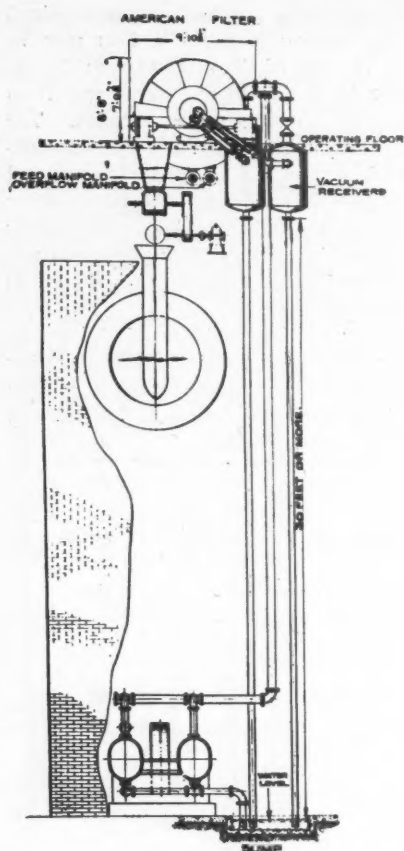
The dewatered slurry (called filter cake) drops from both sides of the filter discs directly on a belt conveyor and from the belt conveyor into the kiln feeder.

By simple control of the suction and filter speed, uniformly constant slurry cake feed enters the kiln.

The water removed from the slurry through the control valves of the filter is piped directly to the vacuum receivers which separate the water and the air, the water draining down a barometric leg to a sump. Suction is provided by an Ingersoll-Rand vacuum pump drawing the air from the tops of the vacuum receivers.

The slurry is made from air cooled blast furnace slag. The filter supplying cake feed to each kiln has a practical operating capacity equivalent to 2400 bbl. of cement per day, when operated on 45% moisture slurry. The filter capacity will be much greater when the filters are operated on thicker, lower moisture slurry.

The interest in filters for the cement industry has been focused largely on clay-limestone and clay-marl plants where the



Ideal layout for cement slurry filter installation in a plant designed to include filters

success of the American filter has been even greater.

Kilns equipped with filters operated most satisfactorily on clay-limestone slurry. Greater fuel savings and capacity increase are obtained by filtration with clay-limestone slurry than with slag-limestone slurry, largely due to the greater amounts of water removed from the kiln per barrel of clinker.

For example, on a slag slurry containing 510 lb. of dry solids per barrel of cement as compared with a clay-limestone slurry containing 625 lb., by reducing each from 33% to 18%, the filters will eliminate only 139 lb. of water per barrel of cement on blast furnace slag against 161 lb. elimination on clay-limestone.

The roller dischargers lift the slurry cake from the filter cloth, which gives a simple practical operation and leaves the cloth clean and unclogged. They were developed for discharging thin cakes and have been used for years in other industries where thin cakes are encountered. Practical knowledge of this problem has been largely responsible for the success of American filters in the cement industry.

The cake from the filter has the consistency of modeling clay and is easily handled on belt conveyors and kiln feeders.

The cake introduced into the kiln in small pieces, affording a large surface for contact with the gases, gives efficient heat transfer. The surface dries quickly and prevents the particles of cake from sticking to each other and to the kiln, thus prevent-

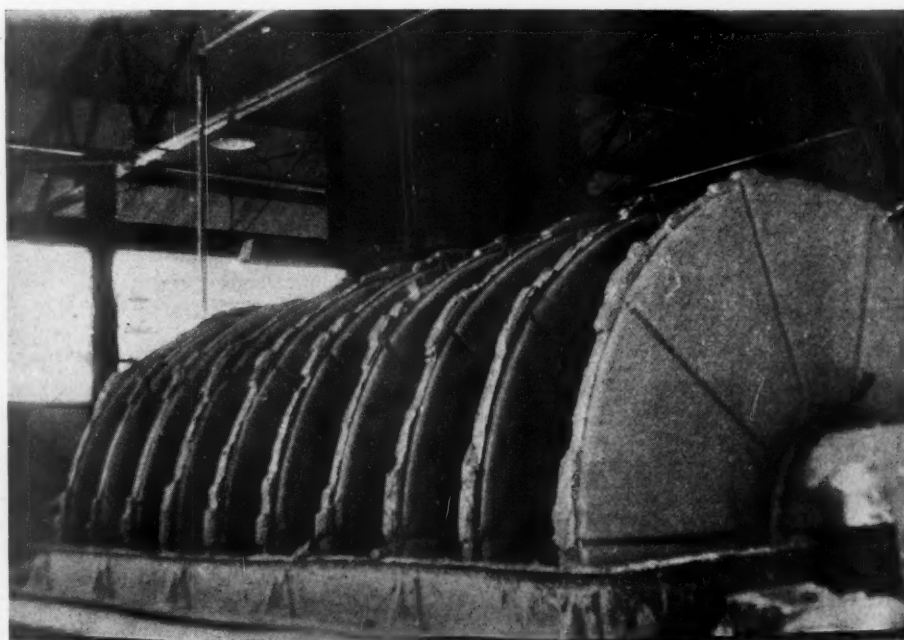
ing the formation of mud rings and mud balls. This dry surface acts similarly to the flour coating used by the housewife to prevent pastry from sticking to board or pan.

The kiln feed is thoroughly dry after a travel of less than 25 ft. in the kiln, similar in appearance to the load in a dry-process kiln, as it is a dry powder free from balls or lumps.

Fuel Savings

The fuel savings on clay-limestone slurries have been greater than predicted; in one case 35 lb. per bbl., or a reduction of 25% from the amount used on liquid slurry. The increase in production has been even greater.

Lengthening kilns reduces fuel consumption per barrel of cement, but does so at the expense of the capacity that can be produced in that kiln, maintaining the same fuel



Cement slurry filters at a new plant

rate. Performance of American filters have proved it possible to make even greater reduction in fuel consumption, and at the same time materially increase the kiln capacity. If waste-heat boilers are used, additional savings are available.

In one kiln, clinker production on clay-limestone filter cake exceeds the highest figures for the same size kiln operating on either dry or wet process, as given in Meade's book on "Portland Cement."

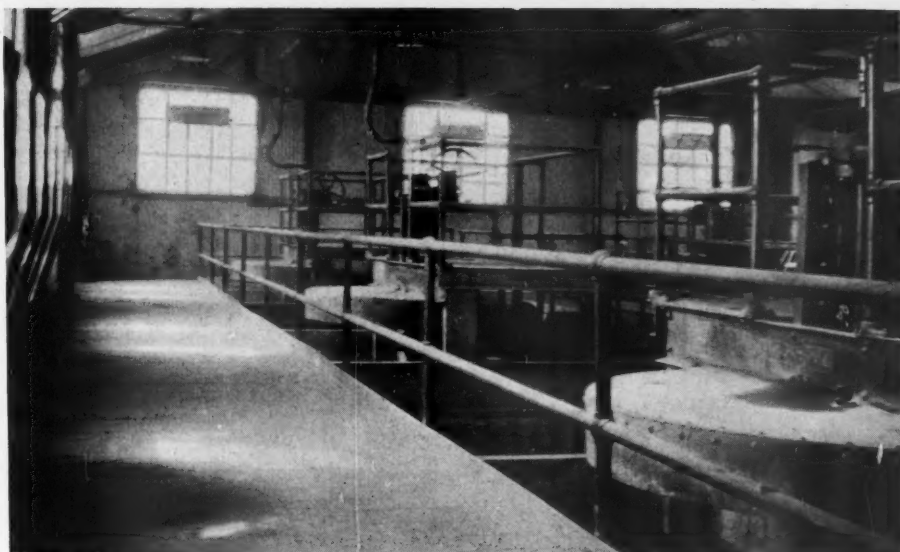
The removal of over half the water from the slurry reduces the weight of stack gases, resulting in better draft, less power required for fans, less wear on fans, and much less stack dust. Calculations show that on a kiln producing 30% more clinker there is a reduction of 12% of the weight of stack gases when operating with 18.5% moisture filter cake over the weight of gases when operating on 36% moisture slurry.

With the lowered weight of gases, the velocity and dust carrying capacity of the gases is reduced. In one plant the dust loss was reduced two-thirds, and the draft fans are all operated at the lowest speed, saving about 65% of the power used when handling the gases from liquid slurry.

Kilns burning American filter cake are easy to operate because of the uniform feed and the freedom from mud rings. They handle similar to a dry-process kiln. The kilns may be pushed to high capacity without the danger of the slurry and load running down suddenly due to the giving away of mud rings. The kilns are clean and the load is easily controlled. This is important when maintaining maximum production of well-burned high lime clinker.

Filters Help Production of Early High-Strength Cement

It has been observed that the fineness of grinding and output of the raw grinding mills can be increased materially by increasing the moisture in the slurry a few per cent over the amount normally used. In one case the fineness was increased from



Slurry agitators and tanks, Federal Portland Cement Co.

91% through 200-mesh to 95% through 200-mesh by increasing the moisture in the slurry from 34% to 39%. This finer grinding resulted in high 24- and 48-hour tensile strength tests.

This high early strength cement can be produced in plants using filters at less cost than ordinary cement can be made from liquid slurry.

The moisture in the filter cake when made from the same material will be the same regardless of the moisture in the slurry fed to the filter. Higher moistures therefore can be used taking advantage of the increased grinding efficiency without increasing the fuel consumption or reducing the output of the kilns.

Clay-Marl Mixtures

The results of the operation on plants that use clay-marl-limestone slurry are even more remarkable. Filters by reducing the moisture in the slurry to 24% from 45% up to 50% relieve the kiln of evaporating about

450 lb. of water per barrel of cement. This results in a reduction of 37% of the fuel consumption for liquid slurry and an increase of about 45% of kiln output.

The operation of the ten kilns equipped with American filters proves conclusively that filtering cement slurry is practical and economical on slurries made from slag and limestone; clay and limestone; and clay, marl and limestone. The kiln output is equal to or greater than the same size dry-process kiln. The fuel used per barrel of cement is only a little greater than the usual dry process practice, and if credit is taken for drying of the raw product in the dry process, practically equal fuel consumption is obtained.

Advantages in Use of Filters

In short, kilns operating on filter slurry cake have the advantages of high capacity and low fuel consumption of the dry process and retain all the advantages of wet process, which are:

(1) Better and more uniform cement due to better mixture of materials and closer chemical control.

The development of the dry blending system requiring a number of bins and complicated handling equipment for the dry mix has partially offset this advantage.

(2) Wet material more easily ground resulting in lower costs and requiring less plant investment.

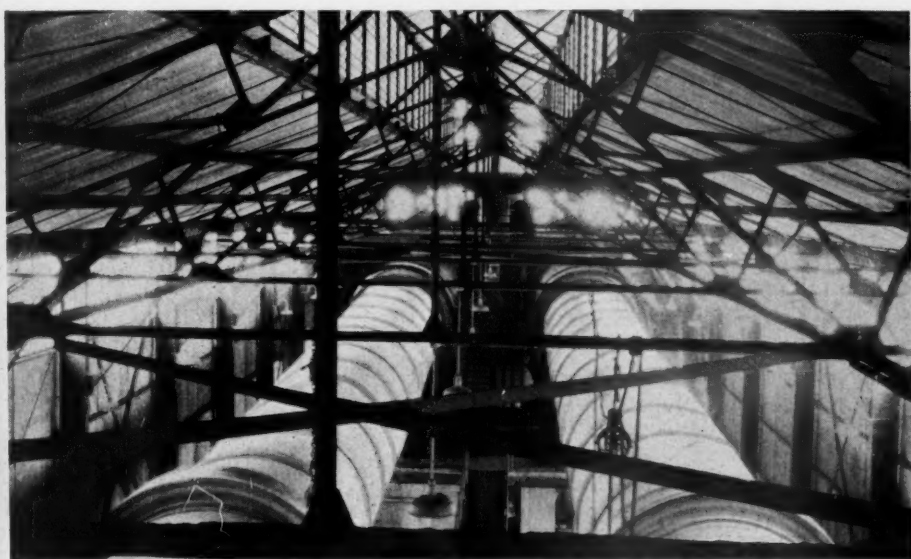
(3) Raw material need not be dried, saving fuel and equipment.

(4) Due to items (1) and (2), clinker not burned so hard and therefore grinds easier, resulting in better cement at less cost.

(5) Mechanical handling of wet slurry easier than dry mix.

(6) Less dust in plant; more healthful working conditions and better labor efficiency.

The American filter was developed in the mining fields of the West to dewater large tonnages of material at minimum cost. The



Kilns at the Federal Portland Cement Co. plant from filter gallery

filter is built for continuous 24-hour, year to year service. Hundreds are in use.

The extremely rugged construction and compact design, together with the fact that the cloth can be changed without stopping the filter make it particularly adaptable to the cement industry.

The American filters are stopped in one

plant only when the kiln is shut down for punching a clinker ring.

The superintendent of one plant stated that this filter was one of the most reliable machines in his plant, and that his records showed less production time was lost due to filters than any other piece of equipment connected with the kilns.

Grand Outlook for Road Building in Illinois and Iowa

WHILE REPORTS from many state highway departments show little diminution of road-building activity in 1928, two Middle-West states in the corn belt are planning to break all previous records. A dispatch from Des Moines, Iowa, to the *Chicago Tribune*, dated December 13, stated:

"Iowa today was practically assured of a special session of the Legislature to vote on a \$100,000,000 state bond issue for the purpose of paving Iowa's roads within six years. Governor John Hammill is in favor of the project and it is expected that he will call the session within three weeks. The Legislature is said to be in favor of the bond issue.

"Governor Hammill amplified his statement today regarding his position on the question, making clear that he favored and would sign a bill providing for \$100,000,000 indebtedness, county and state, in which the state bond issue would absorb the \$64,000,000 now out in county bonds.

"The action of Governor Hammill in endorsing the plan is expected to bring to the petition for the bond issue the names of many who have been favorable to a bond issue, but who have held back from signing."

On the same day Frank T. Sheets, chief highway engineer of Illinois, told the Illinois Association of Highway Engineers and municipal contractors that:

"The estimated cost of 1928 construction, including that in Cook county, will be \$57,000,000. I think that this huge undertaking will stand as a record for all time in the past in a single state in America or perhaps any country of the old world, in a similar length of time."

Mr. Sheets gave his listeners some broad details of the present highway status and the developments to be expected within the next ten months. The mileage and other features of construction he tabulated as follows:

	Paving miles	Grading miles	No. of bridges
Under contract Dec. 1....	414.0	83.0	100
Lettings for Dec. 21.....	63.9	2.5	13
Lettings for Jan. 2.....	225.9	166.0	37
Lettings for Feb. 1.....	229.2	59.6	21
Lettings for March 1.....	200.0	75.1	....
Totals.....	1,133.5	386.2	171

Cook County's Program

"In addition to this, as definitely settled, is the work by Cook county. That unit," he said, "is to build 450 miles of road, 100 miles of grading and 50 bridges. The road work included in these schedules, state and county, consist of concrete slab pavements.

"The grand total therefore ready for contract or already under contract, will amount to 1,583.58 miles of concrete pavement, 486.28 miles of grading and 221 bridges. The state's estimates indicate that the state's portion of that work will cost just over \$42,000,000."

Mr. Sheets, in prefacing his predictions of actual work for 1928, said the fulfillment of this prophecy was predicated on the Supreme Court sustaining the gasoline tax.

Expect Records to Fall

"I believe that the next five years will mark the greatest era of activity in highway construction in history," he added. "We have just finished cleaning up the tag ends of the \$60,000,000 bond issue this summer. Under the law we could not go ahead with the building work provided for in the \$100,000,000 bond issue until the proceeds of the former issue had been disposed of definitely.

"We have gone ahead with the preliminary work, however, in regard to the \$100,000,000 bond issue program, and I can report that we have held public hearings on the location of 2,500 miles of highway projects and finally have determined locations in the case of 1,400 miles of it. If the gasoline tax is productive of the money that was estimated, the balance of the 10,000 miles of road system can be completed in the period of five years.

"Last year we built 650 miles of concrete pavement. Of this, 520 was the work of the state as such and 130 was state aid road constructed by the counties under our plans and approval, to be taken over for maintenance and paid for."

Mr. Sheets informed the contractors, about two hundred of whom had gathered for the annual convention, that he wished his announcements to be taken as practically official. He hoped it would result in the contractors starting to sharpen pencils

to figure on this big volume of contract work.

Mr. Sheets expressed the view, however, that despite the huge volume of work to be done on the highways in 1928, the state would expect contractors to keep within reason and the engineer's estimates for current projects.

"This will be presidential year," he commented, "and already the pinch on industrial activity is being felt throughout the United States. The disbursement of this vast sum will be of much importance to people of Illinois in the coming 12 months."

The practice of shoulder construction, which provides 10 ft. of earth at grade on either side of concrete pavement, and constitutes a basis for inexpensive and easier widening operations when necessary, resulted last year in the construction of 1,700,000 cu. yd. of shoulder building, for which \$500,000 was paid.

Another Political Miscarriage!

FLEM D. SAMPSON, new governor of Kentucky, who was seated December 13, in his inauguration talk, discussed among other state matters the question of either the state establishing its own cement plant, or arranging with manufacturer or manufacturers to establish a state plant or plants, which would furnish the state with cement at a substantial reduction in price.

That part of his talk read:

"The state's business, which is our business, requires thousands of barrels of cement annually. Would it not be good business for the state to induce some cement concern, not connected with the cement trust, to establish a plant or plants in different sections of Kentucky, which, using Kentucky materials and employing Kentucky labor, would produce cement sufficient for all state needs, the state agreeing to specify this particular cement, of designated high quality, in all road, bridge and similar public projects, at a substantial reduction in price? This would effect an enormous annual saving to the taxpayers and help us to build more and better roads.

"Similarly we should encourage the establishment of sand, gravel and crushed stone industries in every section of Kentucky. In other words, I believe we should put business into the conduct of state affairs, compelling every dollar to exert its greatest purchasing power, negotiating the most advantageous contracts, and at the same time promoting the general welfare of the state by encouraging industry within its borders.

In another section he discussed encouragement of the cement industry along with others, stating:

"Many of our great industries, all interdependent, such as farming, stock breeding, dairying, lumbering, coal mining, oil and gas production, rock asphalt, the mining and marketing of fluorspar, power utilities, and the greater development of our cement industry, together with manufacturing generally, should be systematically emphasized, encouraged and fostered."

Nonmetallic Minerals Station, Bureau of Mines, in Many Activities*

Work Covered Investigations in Lime, Gypsum, Potash
Metallurgical Limestone, Mica and Slate Industries

By Oliver Bowles

Supervising Engineer, Nonmetallic Minerals Station, Bureau of Mines

THE NONMETALLIC MINERALS EXPERIMENT STATION of the United States Bureau of Mines is located at Rutgers University, New Brunswick, N. J. The technical staff consists of Oliver Bowles, supervising engineer; J. R. Thoenen, mining engineer; J. F. T. Berliner, chemist; Ernest E. Berger, chemist, and O. F. Neitzke, chemical engineer.

The purpose of the station is to render service to the great group of nonmetallic

extensive data accumulated over a number of years. Both field and laboratory studies are conducted.

Effect of Steam in the Limekiln

Ernest E. Berger completed early in 1927, a series of tests to determine the actual effect of steam injected beneath the grates of lime kilns, a practice which is very widely employed in the industry. Careful experiments were conducted with limestone in a platinum vessel suspended in a quartz tube, heated in an electric furnace with the temperature carefully controlled. It was found that the chemical or catalytic effect of the steam on the calcination process was negligible, but that it had a decidedly advantageous effect on the fuel bed by lengthening the flame and equalizing the temperature throughout the kiln. Carbon dioxide has practically the same effect as steam. The results of this work have been published as Bureau of Mines Technical Paper 415, "The Function of Steam in the Limekiln" (abstract in ROCK PRODUCTS, July 9, 1927).

Anhydrite in Cement Retardation

During 1925 Ernest E. Berger completed tests with anhydrite (CaSO_4) as a substitute for gypsum ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$) as a re-

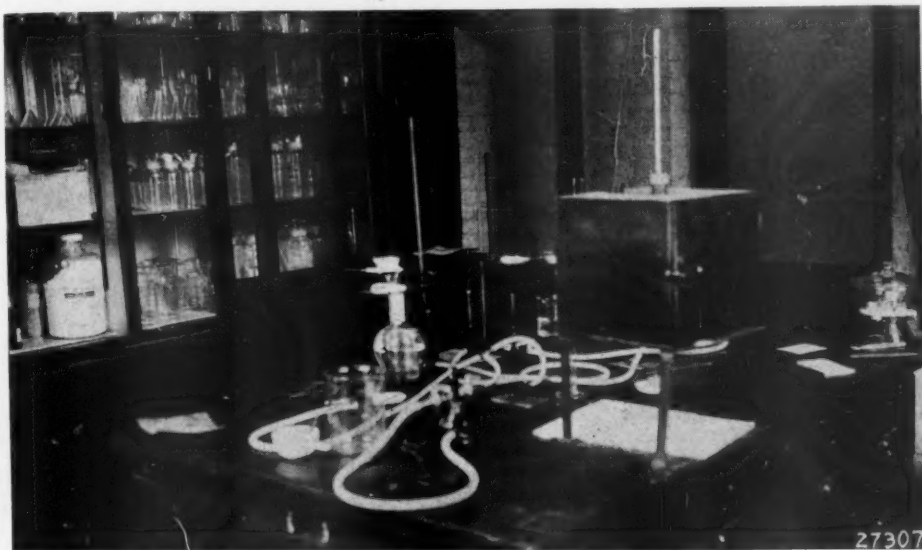
tarder for portland cement. The results of these tests as published† indicated that anhydrite alone was a poor retarder, but when mixed with other calcium sulphates, such as gypsum and plaster of paris, it gave good results. Certain questions have later arisen as to the possible effect of extreme fineness of the anhydrite. The retardation effect, while not well understood is thought to depend on the solubility of the retarder and as extreme fineness would increase the rate of solubility it was thought that fine grinding might render anhydrite an effective retarder. It was thought also that natural anhydrites from different localities might act differently. The effect of anhydrite retarder on the strength of the finished cement was also an important point to be determined. It was decided, therefore, to undertake further work on this problem. In order to obtain close control of setting conditions a moist cabinet was designed and constructed. By means of a heating coil and a water spray, temperature and humidity may be maintained with very slight variation from the desired constant. The work is still in progress.

†Berger, Ernest E., "Calcium Sulphate Retarders for Portland Cement," Bureau of Mines Report of Investigations No. 3705, Sept., 1925. (See also ROCK PRODUCTS, October 31, 1925.)



Ceramics building at Rutgers University in which the bureau station is located

mineral industries, such as stone, cement, lime, gypsum, sand and gravel, asbestos, mica and many others. The total production of such minerals and their primary products is valued at approximately \$1,300,000,000 per year, which indicates that they constitute a very important part of the industrial life of the country. The object of the station is to conduct research that will be of general benefit to the industry. Problems which individual companies can work out for themselves are avoided. The problems chosen are those for which the operators lack proper facilities and which are of such a nature that the promise of financial return is too remote to justify expense by producing companies. The determination of fundamental data on which to base improvements in practice which will place the entire industries on a higher level of efficiency and economy constitutes the type of problem which is preferred. However, the station is obliged to devote considerable attention to service work, such as supplying information on mineral subjects from its



A corner of a Bureau of Mines laboratory at New Brunswick, N. J.

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Potash Studies

On account of the wide interest in domestic potash and the extensive prospecting now being conducted by the Bureau of Mines in Texas and New Mexico, it seemed desirable to compile a bibliography and abstract of literature bearing on foreign potash industries. Thousands of references have been recorded and many of the articles abstracted by J. F. T. Berliner. The literature covered includes geology, mining methods, equipment, costs, reserves, production and all other data that might be of interest to producers of potash salts, or that would be essential to the detailed research on potash ore treatment which is now in progress.

Core-drilling prospecting has been in progress for some time in Texas and New Mexico and potash minerals similar to those occurring in the Stassfurt deposits of Germany have been found. Potash bearing cores have been shipped to New Brunswick and O. F. Neitzke, chemical engineer, is now working out a process of extraction, and design of a plant for concentration and purification of the salts.

Revived interest in the extensive greensand deposits of New Jersey has led the Nonmetallic Station to undertake a preliminary study of the possibility of working greensand for potash and other products. It is hoped that ultimately co-operative studies will be undertaken between the Nonmetallic Station, Rutgers University and the Department of Conservation and Development of the State of New Jersey. J. R. Thoenen, mining engineer, is making a preliminary study of reserves, commercial conditions, transportation problems, foreign competition and possible by-products.

Metallurgical Limestone

Many metallurgists are unfamiliar with the quarry problems of the flux producer, and on the other hand the quarry operators are unfamiliar with utilization problems, such as the requirements as to size, physical and chemical characters, and effects of impurities for the different uses. The outstanding purpose of the study undertaken is to correlate producer's and consumer's problems in order to establish more economical methods both of production and utilization. A report* covering the general features was issued in June, 1927 (published in full in *Rock Products*, July 9 and 23, 1927). The chief study conducted by Oliver Bowles during the past year relates to problems of use on which there is considerable doubt and confusing differences of opinion. In order to clear up some of these differences a paper, entitled: "Utilization Problems of Metallurgical Limestone," has been prepared for presentation at one of the Iron and Steel Sessions of the American Institute of Mining and Metallurgical Engineers annual meeting in Feb-

*Bowles, Oliver, "Metallurgical Limestone," Bureau of Mines Information Circular 6041.

ruary, 1928. It is hoped that the discussion aroused will assist in settling some of the disputed points.

Mica Investigations

Few mineral subjects command greater interest at the present time than mica. This is due in large part to its wide use in radio, and to the essential character of its application in electrical equipment. This is an age of electric machinery, and every electric machine requires mica for insulation. W. M. Myers made a wide study of the industry, and he prepared a brief general report† which was published in June. During the progress of his studies he found that there was great waste of fine-grained mica during the wet grinding process. As the result of a series of laboratory tests he found that much of this waste could be recovered by the application of electrolytic flocculation. This method of recovery was published.‡

The Wire Saw in Slate

The enormous waste in slate quarrying which reaches 70 to 94% of gross production led to extensive experimentation to determine better means of making primary cuts in the quarries. The tests made early in 1927 have been recorded in considerable detail.* Since the publication of this report rapid progress has been made in developing a core drill which successfully sinks a hole 36 in. in diameter. Such holes are necessary in which to place the standards carrying the wire saw sheaves. The wire has been found to cut successfully in the hard vein as well as in the soft vein slate. The equipment is in use in six quarries and other companies have ordered it. The new method is greatly reducing the waste, and also the cost of quarrying. Since September the tests have been supervised by J. R. Thoenen, mining engineer, and a further report† has just been issued.

Nonmetallic Activities at Other Stations

The engineer in charge of the New Brunswick Station has advisory supervision of nonmetallic work at other bureau stations. The increasing importance of research in nonmetallics is evidenced by the fact that nonmetallic problems are in progress at four other experiment stations of the bureau. The Northwest Station, at Seattle, Wash., is making a study of mining, preparation and testing of ochres and other mineral paints. The clays and feldspars of the northwest have been studied and improved methods of clay drying are

†Myers, W. M., "Mica," Bureau of Mines Information Circular 6044.

‡Myers, W. M., "The Use of Flocculating Reagents for the Recovery of Fine Mica," Bureau of Mines Reports of Investigations 2798, March, 1927.

*Bowles, Oliver, "The Wire Saw in Slate Quarrying, Preliminary Report," Bureau of Mines Report of Investigations 2820, July, 1927. Also *Rock Products*, August 20, 1927.

†Thoenen, J. R., "The Wire Saw in Slate Quarrying, Supplementary Report," Bureau of Mines Report of Investigations, December, 1927, has just been issued.

being tested. The Mississippi Valley Station, at Rolla, Mo., has worked out greatly improved methods of milling fluorspar and several of the mills in the Rosiclare, Ill., district have been partly remodelled in accordance with bureau recommendations. One fellowship is now being devoted to methods of fluorspar concentration, by means of which the impure ores may be raised to acid grade.

The Rare and Precious Metals Station, at Reno, Nev., has undertaken the interesting problem of determining the character, properties and action of various oil-bleaching clays. The Southern Station, at Tuscaloosa, Ala., continues its study of bauxite concentration. This is a very difficult problem. Flotation methods are now being tried. Work has also been started on flotation of phosphate rock.

A. I. M. E. Activities

To encourage the preparation of papers on nonmetallic subjects and to increase the interest of mining engineers in nonmetallic problems much activity has been pursued in the work of the American Institute of Mining and Metallurgical Engineers. Oliver Bowles is chairman of the nonmetallic committee of this organization. For the February, 1928, annual meeting a program of seven or eight papers on widely different subjects has been arranged. Details of the program will be given later.

Other Activities

The Bureau's Station maintains extensive information files, and one of its duties is to impart all sorts of information on mineral subjects to visitors or by correspondence. Many mineral specimens are sent in for identification or valuation. Close contact is maintained with such trade associations as the National Slate Association, National Lime Association, National Crushed Stone Association, Gypsum Industries, Inc., National Sand & Gravel Association and the Marble Dealers Association. In this way the bureau is constantly in touch with new developments and new problems in production, primary manufacture or use. Close co-operation is also maintained with the American Society for Testing Materials in its development of standards, tests and specifications.

Florida Portland to Purchase Plant Site

NEGOTIATIONS virtually have been completed by the Florida Portland Cement Co. for the purchase from the Seaboard Air Line Railway of 27 acres of land comprising the site of the Tampa plant, it was announced by Charles A. McKeand, assistant to the president, John L. Senior of the company, who is in Chicago. The company has held the property under lease. The purchase price was not announced.—*Tampa (Fla.) Tribune*.

New Machinery Developments

THE FEATURE of the developments in rock products machinery that strikes one most forcibly is the tendency to build large units. In fact, larger units have been installed, and are now working, than would have been considered practical a few years ago. This is partly due to the desire to save man hours, by having an operator run as large a machine as he can, and partly due to the advance in mechanical and electrical engineering. The very largest shovels built this year (not for the quarry industry, however) would have been altogether too unwieldy to be used with any power but that of an electric motor. Some of the large grinding units could not have been built without developing new methods of manufacture, and the very long kilns built have demanded that especial attention be paid to support and driving methods.

In transmission machinery, the speed reducer has continued to displace some other forms, but the short center rope (rubber strand) drive of special construction has made even greater proportional gains.

The use of ball and roller bearings, especially roller bearings, has greatly increased. Practically all new conveyors are equipped with ball or roller bearing idlers. A new and somewhat startling development is the

employment of these bearings in the heaviest machinery, such as long compartment mills, and mills which have to stand heavy shocks combined with high speed, such as hammer mills. The tendency seems to be to make *all* bearings of the anti-friction type, an example being their use on the shafts of a gear train driving a cement kiln.

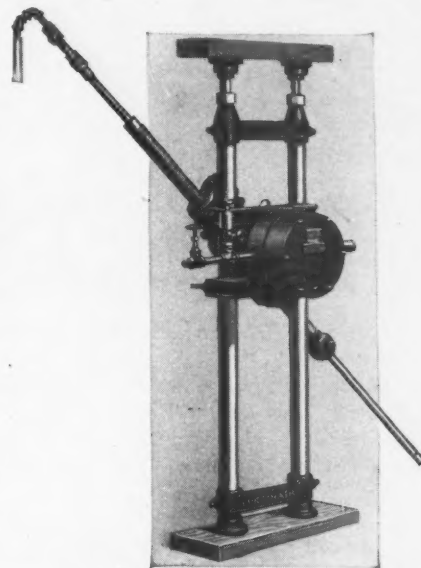
Electric motors have developed rapidly, especially in the synchronous and variable speed types. One of the former has such a high torque that it can be used to start a tube or ball mill without a clutch or equivalent. A double-wound variable speed motor has so many changes of speeds, all with the same efficiency, that it can practically replace a direct current motor.

In prime movers the increasing use of the full-Diesel engine is perhaps the most noteworthy development, and this has been made possible by considerably decreasing the weight of the Diesel engine and building it in such small sizes that it can compete with the gasoline engine. The first American Diesel locomotives for quarry use appeared this year.

In screens there is a decided tendency to use roll grizzlies and vibrating screens in place of rotary screens. Several new makes of vibrating screens were introduced.

ernor Co., the merger now being known as the Gardner-Denver Co. A new line of compressors, drills, sharpeners, air and electric hoists is being made. Twenty branch offices in the country and others in several foreign countries are being maintained.

Of the 1927 developments the company considers its portable, gasoline engine driven compressor made in five sizes. It has also



Rear view of diamond core drill for underground work, showing the motor

Drilling and Blasting

THE Armstrong Manufacturing Co. announces that while it has brought out no new models of its well hole drills for quarry purposes, it has made numerous minor improvements and developed new features and methods in keeping with the general growth of the industry.

The Loomis Machine Co. was among the

pioneers in 8-in. blast hole drilling, and its development this year has been connected with 8-in. work, where this might be found advantageous.

Improved material for joints has been developed, and special analysis steel is used where it comes in contact with hard rock.

The new model of the "Loomis Clipper" is mounted on crawler tractor wheels where these are desired. A feature of the new Loomis drills is the patented "load carrier" which aids in leveling the drill. It is a simple screw adjustment with a shoe resting on the rim of the wheel. In use the rear end of the machine is first set level cross-wise and the front end is quickly adjusted to the rear end by the carrier. Differences due to uneven setting of the front wheels may be quickly adjusted.

The Denver Rock Drill Manufacturing Co. united with the Gardner Gov-

brought out a new model of the "Waughammer" drill, No. 11. This is a 50 lb. machine of rifle bar rotation type but designed to have superior drilling speed and smoothness from better general efficiency and improved valve action.

The Sullivan Machinery Co. has brought out several machines for use in the rock products industry. One, the T-3 hammer drill, has been especially designed for drifting and tunneling work in underground working, but it can also be mounted on a tripod for down-hole drilling in open quarries.

There are two new Sullivan diamond core drills, the "Bravo 300" and the "Baby Turbinair." The "Bravo 300" is adapted for test borings from 50 to 200 ft. in depth. It is readily portable and may be driven by hand power, electric motor or gasoline engine.

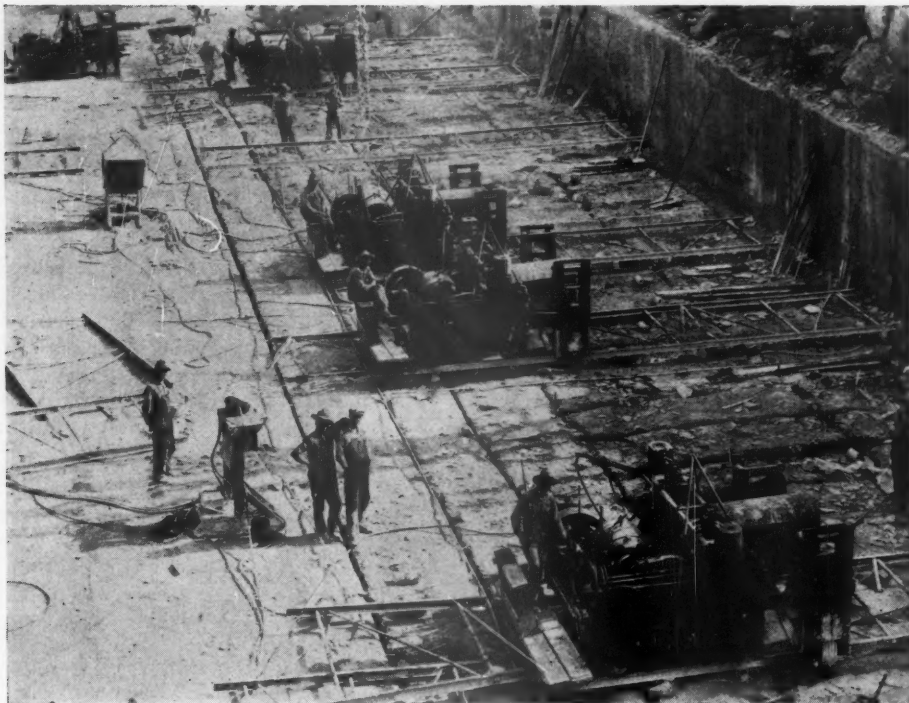
The "Baby Turbinair" is intended for the short holes of underground prospecting. It can drill at any angle and will remove a 15/16-in. core to a depth of 150 ft. The motor is the Sullivan "turbinair."

The Sullivan augur rotator Class H-8 is used in soft rock and it may be equipped with a hollow piston and used with hollow steel and water attachment for underground work.

The L-5 medium and L-S heavy rotators



Hammer drill mounted on tripod for tunneling and drifting work underground



Battery of roller bearing mounted channelers at the Indiana Limestone Co.

are for medium heavy drilling on down holes where the drill is held in the hand or, in very hard rock, for deep holes and other severe conditions in quarries. They are de-

signed to be rapid and economical drillers.

Channelling machines, such as are used in the cut stone industry, are now provided with Tinkham roller bearings.

Excavating and Material Handling

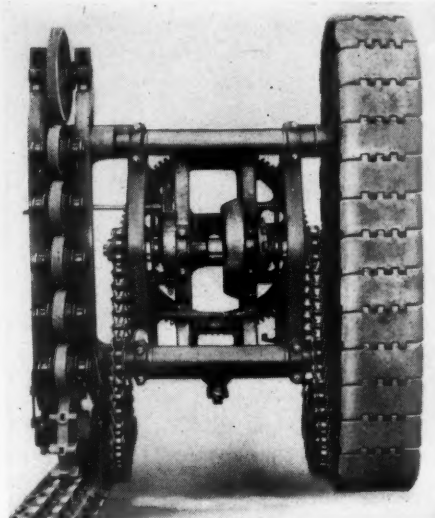
Descriptions of excavating machinery published during the year include: Bay City tractor shovel (Jan. 9); American Hoist and Derrick Co.'s shovel (Oct. 29); Bucyrus 1-yd. Diesel shovel (Mar. 19); Harnischfeger trench hoe (May 14) and ½-yd. shovel (Mar. 5); Marion electric stripping shovel (Nov. 26) and 2½-yd. revolving shovel (Oct. 1); Northwest con-

vertible ½-yd. and ¾-yd. shovels (May 14); Page crawling dragline (Sept. 3); Thew 1-yd. power shovel (Apr. 30) and trench hoe (Oct. 15).

The Erie Steam Shovel Co. (Bucyrus-Erie Co.) brought out a new caterpillar mounting which is made standard on the Erie gas-air and Bucyrus-Erie B-2 steam shovel. It is extremely simple, having

only one drive shaft and one gear below the deck, and it has 12-in. clearance underneath. It is claimed to be faster and able to make sharper turns than some older models.

The Orton Crane and Shovel Co. recently brought out three new models of convertible cranes. Model A has a capacity of 6 tons and handles a ½-yd. bucket with a 30-ft. boom. Model G is rated at 10 tons, or 1 yd., and Model W at 12 tons, or 1¼ yd. All these may be operated by gas or electric motor. The ratings are conservative, with a liberal safety factor. All are equipped with the

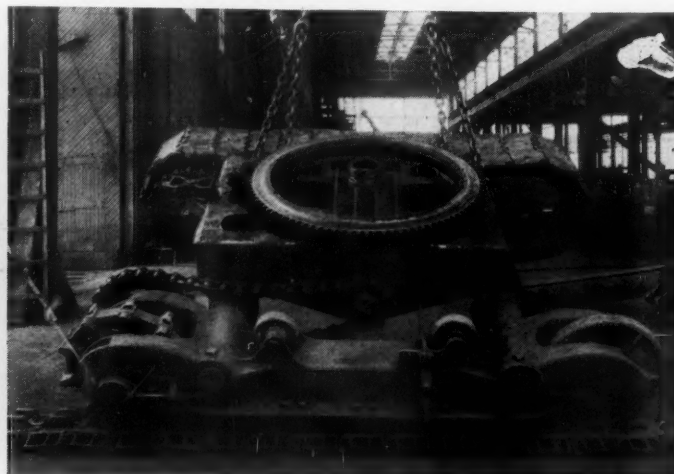
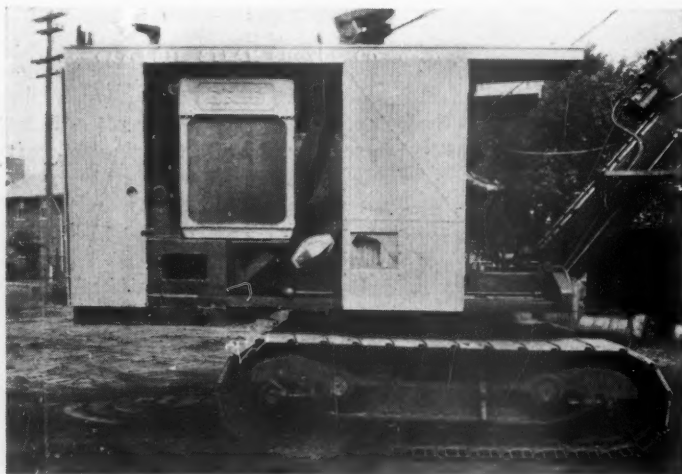


Showing the single drive shaft and gear set below the deck on a new type of caterpillar mounting

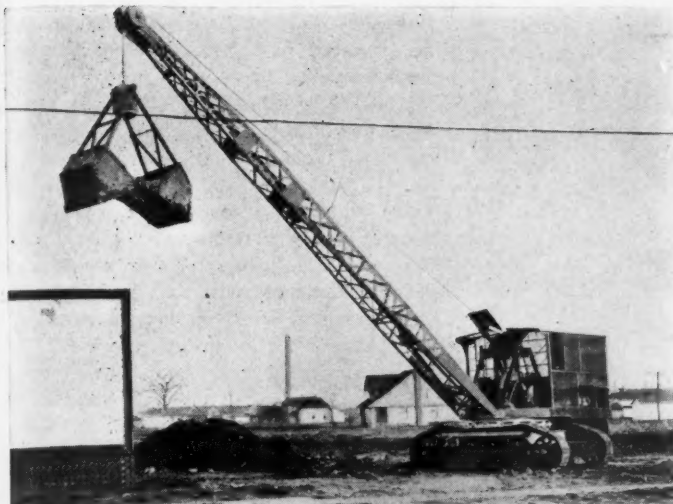
Orton flexible crawling tread and are full revolving.

The Marion Steam Shovel Co. has found a greatly increased demand for electric shovels and for shovels of the full revolving type and has brought out two new models, Types 490 and 4160, to meet it. Several of them were placed in quarry service in 1927.

Type 490 is a 2¼-yd. machine with 26-



Left—Power shovel on new type of caterpillar mounting, and, Right—A view of the new mounting showing its one-piece construction



New 10-ton crane operated by gas or electricity



New dragline bucket with scoop of one-piece steel construction

ft. all-steel boom and 17-ft. dipper handle which will handle 1200 to 1500 yd. daily under normal conditions. The pictures show it in use at the quarry of the Lynn Sand and Stone Co., Lynn, Mass.

Type 4160 has a 29-ft. 6-in. boom and a 4-yd. dipper and is mounted on two-belt crawling trucks. It is expected that this will often replace the railroad type of steam shovel, so the same design has been kept with modern refinements to make it fast.

The Harnischfeger Corp. announces Diesel equipped excavators in 1¼-yd. and 1-yd. sizes for shovels and draglines and 1½-yd. and 1¼-yd. sizes for rehandling, clamshell service. These are all equipped with the 4-cylinder, 4-cycle type of full-Diesel engines, starting cold, and the shovels have been designed for this power after four years of experimenting.

The P. and H. "Groundhog" is a fast ½-yd. full revolving machine convertible for use as shovel, clamshell drag line pile driver or trench hoe.

The Bucyrus Co. has brought out several machines this year, the 1-yd. and 1½-yd. Diesel shovels, D-2 and E-2 and the 50-B



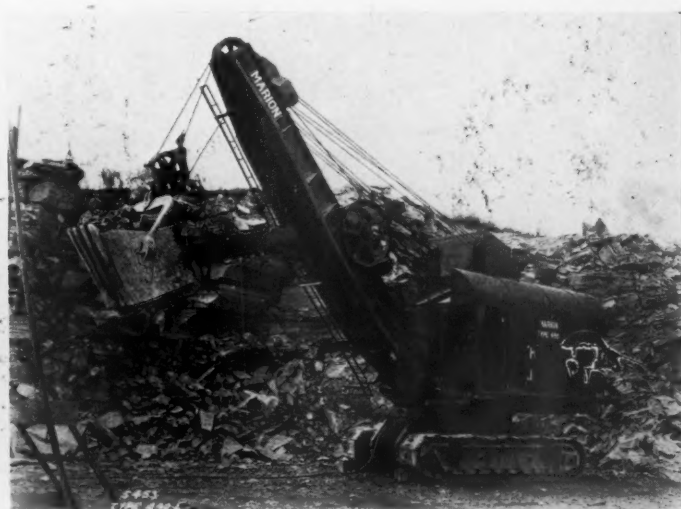
New Diesel-equipped excavator

electric 2-yd. with Ward-Leonard control.

A machine almost too large for quarry use, but of great value to the coal industry, is the 12-yd. stripping shovel, which

is said to be as fast as any 8-yd. machine that has been built.

The company notes that practically all of their machines furnished for the quarry

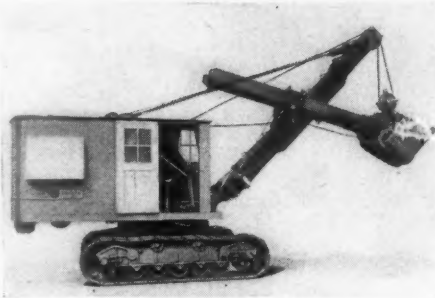


New electric shovel of the full-revolving type, mounted on crawler treads, handling 2¼-yd. bucket on 26-ft. boom

industry are electrically equipped. The 50-B, a "little brother" to the 100-B and 120-B, is meeting with especial favor. Several installations of these B-types have been noted in ROCK PRODUCTS articles in the past year.

The Browning Crane Co. made a number of additions to the Browning line, including a truck crane and the Type E crawler crane. In addition a Type F gasoline crawler crane (of 15 tons capacity) was developed. Like all the others, this crane is of the full revolving type. These cranes have shovel and trench hoe attachment and are equipped for many kinds of crane operation.

The Koehring Co. has added several important features in its 501 shovel, improving it for heavy duty. This is the shovel described in the 1926 Annual Review number. It may be had with 1¼-yd. dipper on a



Shovel improved for heavy duty

16-ft. stick, 1½-yd. dipper on a 14-ft. stick and 1-yd. dipper on a 19-ft. stick.

The Ohio Locomotive Crane Co. announces that new developments will be ready for description in the spring.

The American Hoist and Derrick Co.'s

"American Gopher" shovel-crane is now being placed on the market, the company announces.

The Thew Shovel Co. brought out a 1-yd. power shovel during the year. This company recently made a survey and announce that they find a tendency to use more shovels of the 1¼-yd. to 1¾-yd. sizes in quarry work than larger sizes.

The G. H. Williams Co. has a new dragline bucket with a rigid "double arch" which resists the tendency to pull in at the side in heavy digging. The scoop is formed from one piece of steel, back and sides, with the back flanged in.



Clamshell bucket with improved head construction

The Williams clamshell buckets have improved head construction, a heavy steel plate head with a very short bearing of large diameter. The heavy forged steel corner bars are held together in a rigid A-frame that takes the strain of digging, opening and closing.

The Page Engineering Co. has developed the slackline cableway system for use with its well-known excavating bucket. The dumping device is a forked arm placed over the grizzly, by which the bucket is held in position to dump by gravity. The bucket remains in this position until a second contact releases it.

The Page company furnishes complete installations, including mast, roller bearing blocks and carriages.

The Insley Manufacturing Co. has taken over the business of the Pioneer Bucket Co. and has perfected a complete cableway slackline, which it now has on the market. It offers a complete engineering service in connection with sand and gravel plant installation of these machines.

R. H. Beaumont and Co. introduced the American slackline cableway to the rock products industries this year. The makers claim that it was especially designed for digging hard packed materials. It is also used in handling in and out of storage.



New development in slackline cableway systems

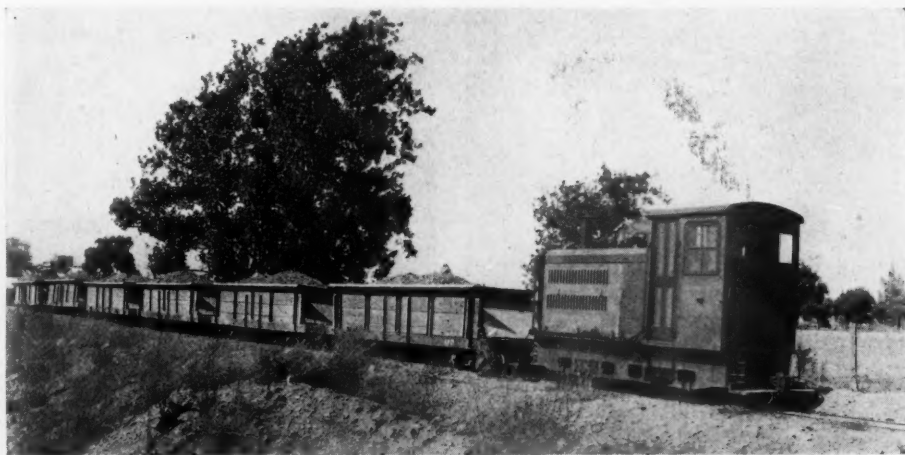
Transportation Equipment

ARTICLES ON quarry and plant transportation equipment published in 1927 include: Baldwin-Westinghouse mine locomotive (Aug. 6); Davenport gas-electric locomotive (Aug. 16); Increasing Use of Diesel Electric Locomotives (Sept. 3); Easton Tractor-Trailer (Feb. 19); German Carrier for Bulk Cement (Nov. 26); Plymouth 10-ton Diesel Locomotive

with four forward and four reverse speeds. The engine is of the Atlas-Imperial type.

Three of these new Diesel locomotives have been installed at the quarry of Kaiser Paving Co., Oakland, Calif., and are said to have given every satisfaction.

In gasoline locomotives the Plymouth line has been so increased that it includes

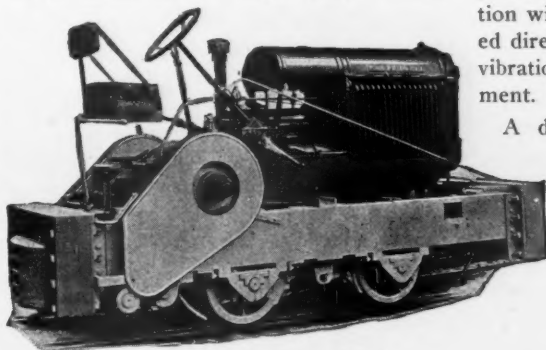


One of three 10-ton Diesel locomotives at a Livermore, Calif., sand and gravel operation

(Oct. 29); Western Wheeled Scraper Co.'s Crawler Dump Wagon (July 9); Whitcomb Gasoline Locomotive (Mar. 5); Wood Truck Carrier for Bulk Cement (Apr. 16).

The Fate-Root-Heath Co. made one of the most important contributions to transportation equipment in the rock products industry, in 1927, by bringing out the first American Diesel locomotives for quarry and plant transportation. The makers' records of the 10-ton locomotive show that it has handled a gross load of 144 tons up a 3% grade at 8-1 m.p.h. Fuel consumption averages 3½ gallons per hour. Where fuel oil is available this locomotive is bound to have many uses in the rock products industry. It is made

all practical sizes from 10 to 50 tons. The Diesel powered locomotives are expected to be made in the larger sizes a little



Gas locomotive with tractor type mechanism

later. One of the cuts shows an 18-ton Plymouth locomotive at one of the largest sand and gravel plants in Ohio.

The Brookville Locomotive Co. offers its locomotive now in 5-ton, 6-ton, 8-ton and 12-ton sizes. All of these are made with the McCormick-Deering mechanism, which is unchanged from the tractor type, merely adapting it to rail traction. An advantage pointed out by the makers is that replacement parts may be obtained from local dealers who handle the tractors. The drawbar pull on the 12-ton machine is given by the makers as 4800 lb.

The chassis of this locomotive is the same as that the Brookville company has made for years, for use with the Fordson tractor engine. The use of the McCormick-Deering power unit was begun in 1927, after a considerable period of testing in 1926. For quarry work this machine may be made equipped with a hoist, giving it a wide application to various uses.

Midwest Locomotive Works reports that it has been developing locomotives with greater power than used in its locomotives in the past, so that they can operate on grades at a higher speed and increase the trips per day. These "super-powered" locomotives will be ready early in the coming year.

The models of the super-power locomotives will embody design features that have already proven themselves on the other locomotives made by this company, particularly the one-piece frame construction with engine and transmission mounted directly on the frame. This is to avoid vibration and to provide for positive alignment.

A double truck gas-electric locomotive, made by the Davenport Locomotive and Manufacturing Co., is considered by the company to be a distinct advantage in locomotive construction. It is doing most of the work that was done by a 75-ton steam locomotive in switching cars and like work, maintaining



New double-truck gas-electric locomotive of 20-ton weight for railway work



A new "super-powered" gas locomotive for operation on grades at higher speed



An 18-ton gasoline locomotive at a large Ohio sand and gravel plant

a schedule of 25 m.p.h. over heavy grades and during temperatures ranging from -47 deg. F. to 110 deg. F. It has many refinements not usual in the ordinary locomotives.

The Woodford Engineering Co. has made some rather unusual installations of the Woodford haulage system in the past year. One was at an Iowa quarry where a 6% grade was carried down through 57 ft. of stripping and then down through the rock. The cars were stopped on the 6% grade, held during the loading, and then started up the grade with 15 tons of rock, all this being accomplished from the central tower, which was 800 ft. away. Tonnage output was maintained at a low cost, in spite of the heavy handicap of the grades.

At one of the larger quarries, it is re-

ported that an average daily tonnage of 7000 tons per day has been maintained by using seven of the Woodford units, the entire transportation system, including the dumping of the cars, being controlled by one man.

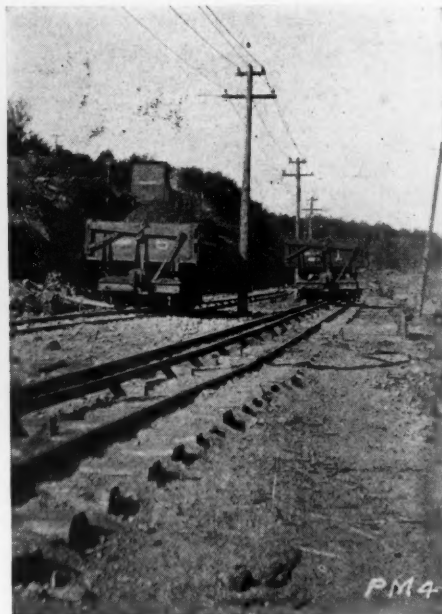
The General Electric Co. has brought out a centrally controlled haulage system for quarry use which it describes as follows:

"The electrical equipment of the cars consists of high-torque squirrel-cage motors provided with solenoid brakes and controlled through a pair of reversing contactors which throw the motors on the line at full voltage. Two current-collecting shoes are used, making contact with two "third rails" located between the traction rails. The separate

tracks on which these cars operate have isolated circuits or the cars can be maneuvered on a loop track with isolated sections.

"The control operator handles the cars from a pilot switch which actuates the reversing contactors, and when the current is shut off the solenoid brakes set automatically and decelerate the car; the torque being adjusted for smooth deceleration.

"With this system a single operator,



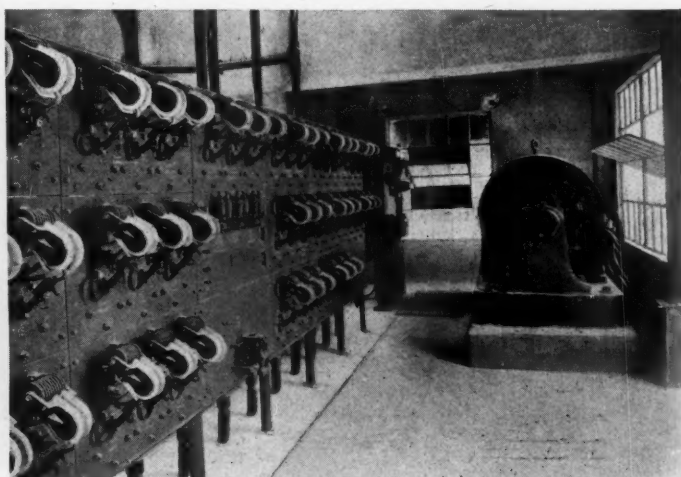
Electric haulage system operating over 6% grade, showing controlling tower at left

located in a tower controlled station from which he can see all the cars, is enabled to start, stop, and even to switch cars on different tracks."

The Caterpillar Tractor Co. has made some interesting applications of its tractor in the rock products industries, one of which is shown in the accompanying cut. Tractors and trailers are meeting with an



Operator in controlling tower handling loading and dumping operations



Control apparatus forming part of electric haulage system

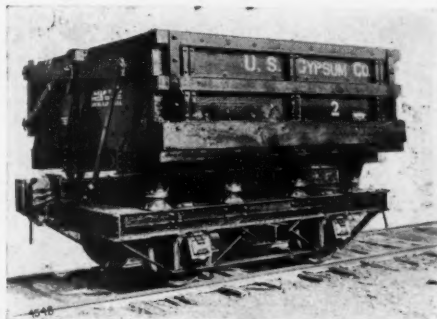


Individual motor-driven car loading at foot of 6% grade during opening up of new quarry

increasing use in both the quarry and the gravel pit. This company's machines have been developed for work over rough and difficult ground and have already met a wide application in the heavy lumbering of the Pacific coast where conditions are about as severe as it is possible to make them, even in quarry service. An article comparing the cost of operating these tractors as compared with the cost of operating trucks was published in *Rock Products* for June 25, 1927.



Tractor-drawn trailers used to remove quarry strippings



Special quarry car of side hinge type and low loading height

The Western Wheeled Scraper Co. has developed two new cars during the year, a special quarry car and the dual side-pivot drop door air dump car. The special quarry car is of the side hinge type and it has a low loading height and no side doors. There is no locking mechanism and the car may be dumped at the crusher by a power hoist.

The drop door air dump car was designed to meet the demand for 25-yd. and

number. The second tendency is to use trucks or trucks and tractors with trailers in the place of cars.

In discussing truck haulage he points out that the favorable conditions for trucks are short haul and crusher below the quarry floor. Under other conditions trucks will not displace cars and locomotives, in his opinion.

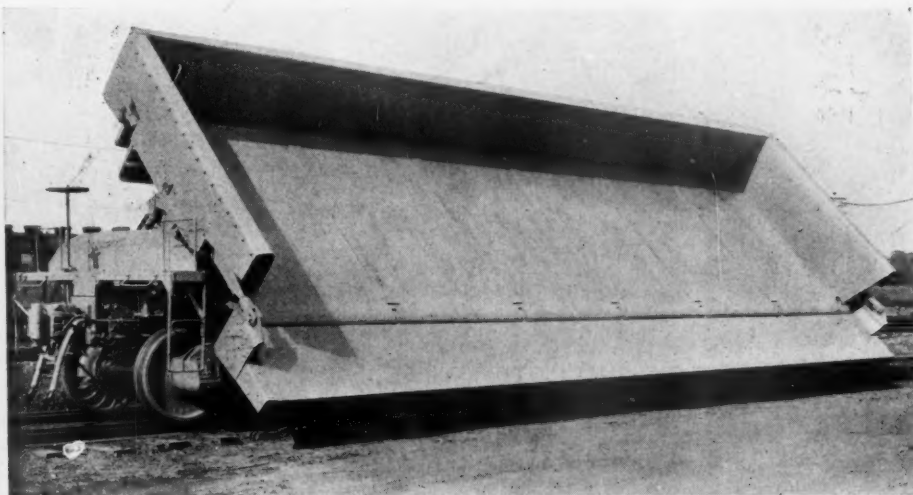
Trailers with tractors is the newest method and it has come into use in 1927, as shown by some of the illustrations in this issue.

Easton quarry truck bodies, the "Phoenix" side dump, and the "Won-Way" end dump were placed on the market by the company this year. They are built to embody the experience of many years of building to withstand rough quarry usage and the shocks of shovel loading.

The "Won-Way" and Phoenix types of quarry cars have been improved in some minor details during the past season.

Webster Manufacturing Co. has introduced a novelty in transportation equipment—the Webster car retarder. It makes car movement safe even when tracks are wet and slippery, and the man loading the car from a chute can move it as little or much as he desires.

The retarder is made in standard and



New dual side pivot drop door air dump car of large capacity



Improved type of all-steel truck body on motor chassis for quarry loading

heavy duty types. The standard has a capacity of 100 tons on a 2% grade; the heavy duty has a capacity of 200 tons on a 3% grade.

The Nordberg Manufacturing Co. announces that its narrow gage track machine will soon be ready for the market.

Explosives

THE problem of the right explosive for the purpose is generally regarded as solved, but new explosives have been introduced during 1927 which permit more economical blasting. The E. I. du Pont de Nemours & Co., Wilmington, Del., latest development is a series of eight low density dynamites which it is marketing under the old brand name of du Pont "Extra." The chief advantages claimed for the new product are satisfactory sensitiveness and good water resistance and that in many operations they can be used cartridge for cartridge in place of standard ammonia dynamites or the lower grades of gelatin with equally good results at a material decrease in blasting costs. The du Pont "Extra" is claimed to have done satisfactory blasting work in blasting limestone, gypsum, shale and clay in various sections of the country.

A new safety bag for transporting explosives, also a development of the du Pont company, was described in Rock PRODUCTS, November 20.

The Hercules Powder Co., Wilmington, Del., has brought out a new explosive particularly adapted to quarry work. This new explosive is divided into six powders

of different cartridge counts and are known as Hercules Extra No. 2 to No. 7. The new powder is designed to substitute for certain types of special powders.

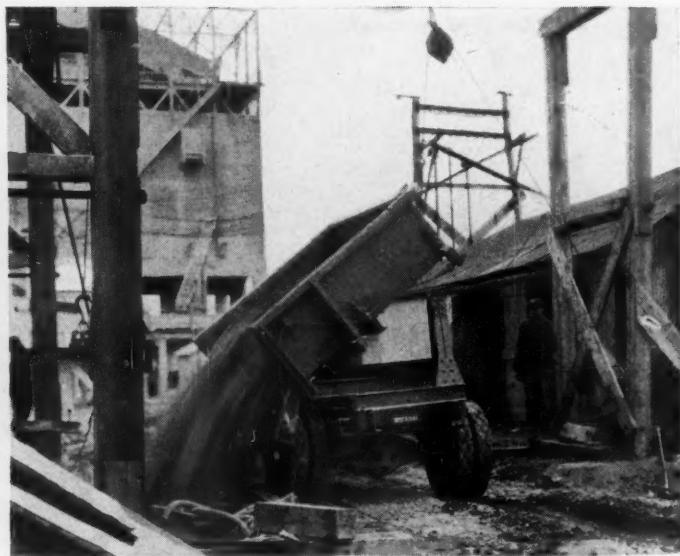
L. O. X., a liquid oxygen explosive, is recommended by its manufacturer, the Air Reduction Sales Co., New York, for use in open quarrying or pit operations.



Shovel loading a new type of all-steel, end dump car mounted on a motor chassis



Improved type of side-dump quarry truck body

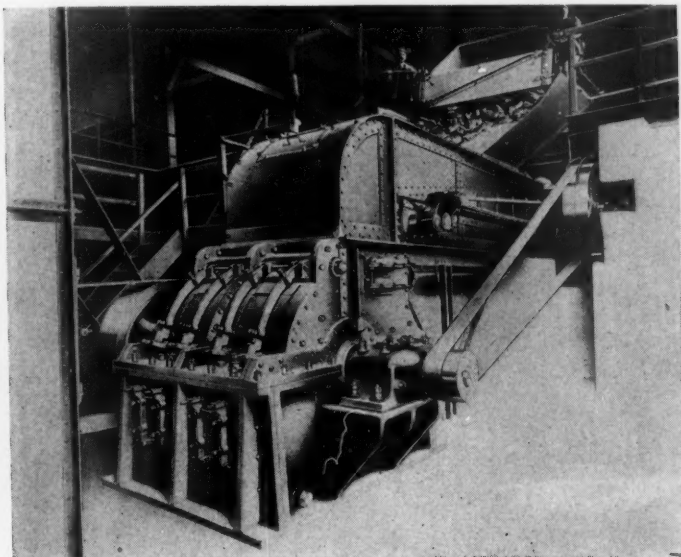


Old type of side-dump body on motor chassis

Crushers and Pulverizers

CRUSHERS and pulverizers mentioned in earlier issues include: Bakstad jaw crusher (Aug. 6); Bonnot swing hammer mill (Apr. 2); Buchanan double-roll crusher (Dec. 10); Horton jaw crusher for fines (Jan. 8); Raymond kiln mill (Sept. 3); Williams hammer mill crusher (Aug. 20).

The Traylor Engineering and Manufacturing Co. reports an interesting installation at the plant of the largest limestone producer. It consists of a 60-in. "Bulldog" gyratory (the second to be installed by this company), in connection with a set of Traylor slugging rolls, 36 in. in diameter and 60 in. long. These have a capacity for 20,000 tons per day.

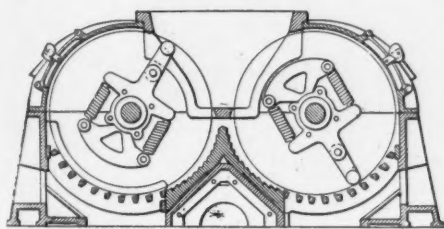


Large hammer mill for single reduction crushing

In the past few months the 15-in. Traylor finishing crusher has been placed on the market, completing the line which includes 4½-in., 6-in., 10-in., 15-in and 20-in. sizes. The 20-in. is said to be the largest finishing crusher available.

The Polysius Corporation has introduced its large hammer mill, single reduction crusher and the first installation has been made in the new Keystone Portland Cement Co. plant.

The American Miag Corp. is building a double hammer mill, the first of the type to be installed in the United States. The first installation of this machine in this country



Double-type hammer mill, first of its kind to be installed in the United States

was in the Osborne plant of the Southwestern Portland Cement Co. It has been used in a number of European plants.

The Good Roads Machinery Co. has added a larger cast steel frame crusher than it has built before, the No. 3½ Climax. This has a 12-in. by 26-in. jaw opening. This company has eliminated cast-iron castings in all its crushers this year and put in twin bearings in the place of single bearings.

A new crusher, on the lines of the Champion, with built up steel frame, is the Good Roads 10x30-in. fine reducing crusher. All the bearings are either Timken roller bearings or S. K. F. bearings.

The Williams Patent Crusher and Pulverizer Co. brought out a new type of its hammer mill which is especially adapted to the crushing of wet and sticky rock. The features which enable the mill to do this are the pusher feeder and the vibrating grate. The pusher feeder employs two reciprocating, piston-like rams to work up and down on the breaker plate and scrape it clean at each stroke, forcing the material into the path of the hammers.

The vibrating grate mechanism rocks the grate bars back and forth like the ash dumping grates of a furnace fire box, the openings remaining uniform, however, so that no oversize can pass into the product. The vibrating motion keeps them from clogging and an adjustment permits them to be raised toward the hammers to overcome wear.

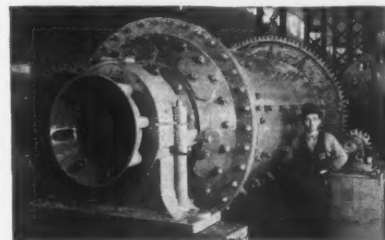
The Dixie non-clog hammer mill, made by the Dixie Manufacturing Co., has been installed in some of the important cement plants of the year. It uses a traveling breaker plate, run by a separate motor, which is continually scraped clean as it travels. These mills were installed in the Penn-Dixie No. 2 and the Florida cement plants and described in the plant descriptions published in *Rock Products*.

One of the illustrations shows the Hardinge Co.'s conical ended rod mill which

was described in the June 11 issue of *Rock Products*.

In the pulverizer field there is an entirely new machine, the Bethlehem pulverizer, made by the Bethlehem Steel Co.

The Bethlehem pulverizer consists of a revolving horizontal table on which the grinding takes place, and air separator housing which encloses and extends above the grinding table and in which air separation is effected; a screw-feeding device for introducing the material on to the grinding table; and the supporting housing or framework.



New conical-ended rod mill

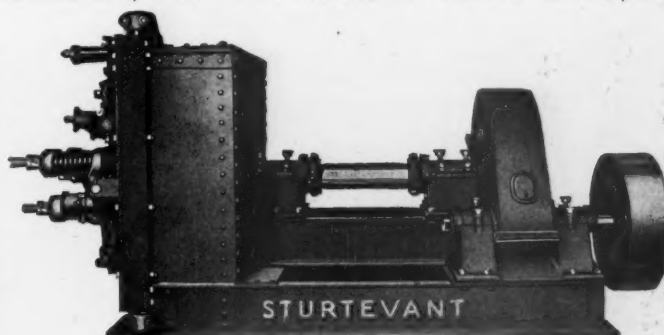
In addition an exhaust fan and a cyclone collector are provided. The pulverizer operates on the closed air circuit system, the exhaust air from the cyclone collector being conducted back to the air intake.

The fineness of the product is adjusted in the air circuit system by varying the angle of the vanes through which the air passes. A simple adjustment which varies the pressure of the rollers on the track table also regulates the fineness of the product. A third adjustment affecting the product is the amount of feed admitted to the machine and this may be varied in any degree from nothing to the full capacity of the feeder. The main adjustments can be made while the machine is operating.

The machine has already been installed to grind coal, gypsum, limestone, silica, phosphate rock and other rock products.

The Sturtevant Mill Co. has made improvements in its ring roll crusher, the casing and the method of driving having been modified.

The Raymond Bros. Impact Pulverizer Co. introduced its "kiln mill" in 1927, de-

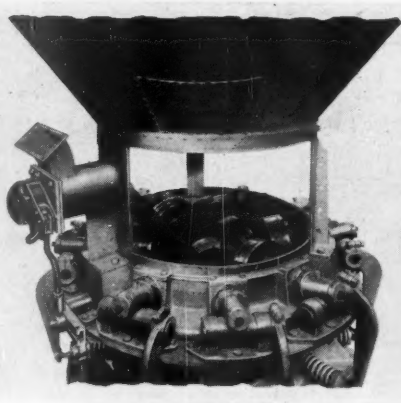


New form of ring roll crusher

scribed in an earlier issue of *Rock Products*. Several installations of this machine were made, the most interesting being those

in which waste heat has been used, so that added efficiency of the grinding mill is secured at no additional cost. One such installation is in the plant of the Florida Portland Cement Co., described in *Rock Products* for November 26. The heat in this case is taken from hoods over the hot ends of the kilns and the coolers which collect the air heated by radiation. This is drawn into the mills by the regular fan on the air-separation system.

Improvements to its grinding equipment and a new line of mills known as the Lehigh mill were brought out in 1927 by the Fuller Lehigh Co. The new mill embodies the principle of the Fuller mill in a unit equipped with roller bearings, the die being lowered to the base of mill to give the unit rigidity. Four sizes, Nos. 36, 48, 54 and 70 are being manufactured, all of which are either screen or air classifying type mills. For the screen type mill the company has developed a new internal protecting screen



Interior of new table-rod mill

which is said to increase the screening surface and in connection with the air separating type mill, it has developed a new separator section.

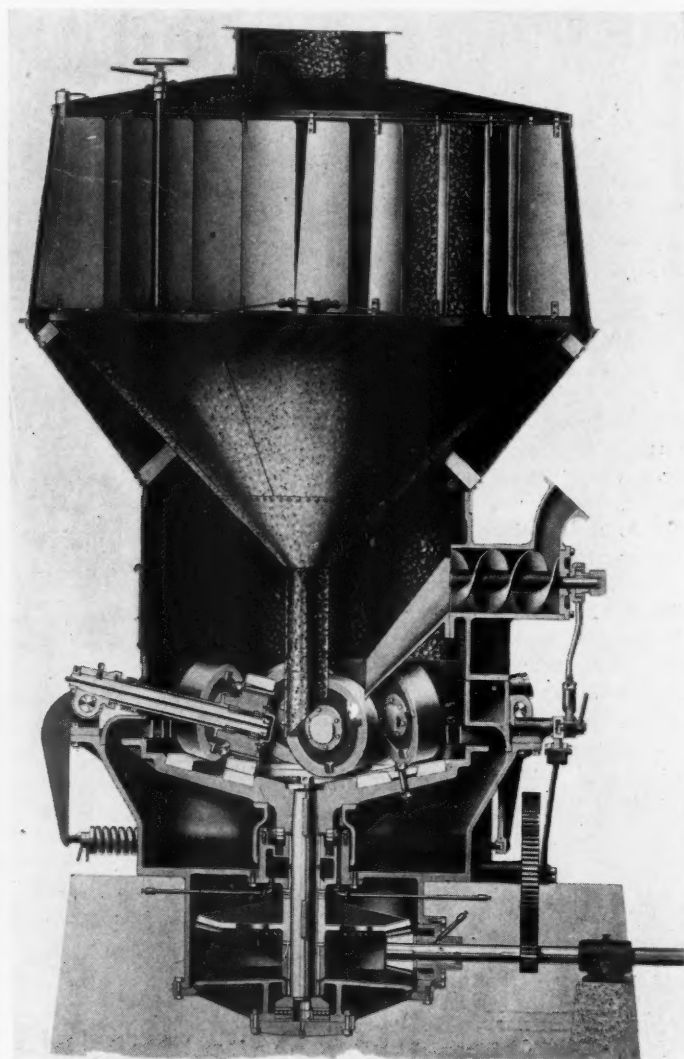
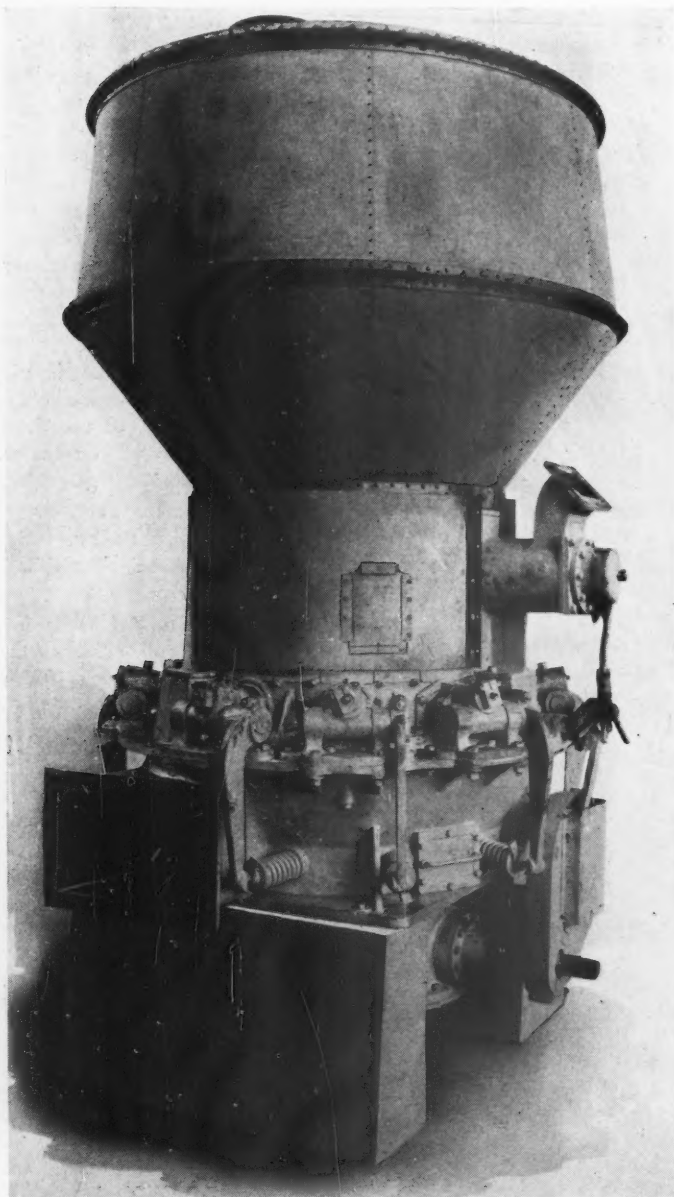
Compartment mills, as described more in

detail in the portion of this issue devoted to developments in the portland cement industry, have grown to enormous sizes. The largest unit reported is 45 ft. long and of 9-ft. and 10-ft. diameters. This was made by the Allis-Chalmers Manufacturing Co. It is mounted on roller bearings.

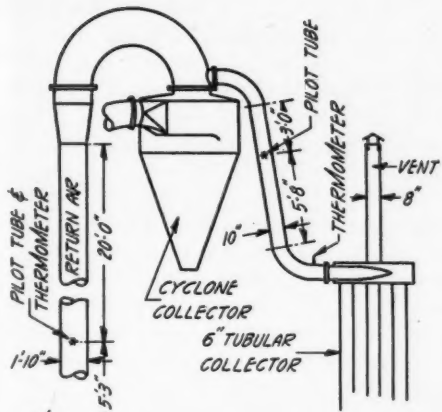
The Traylor Engineering and Manufacturing Co. made a number of installations of large compartment mills, among which are noted:

A 7-ft. dia. x 45-ft. compartment mill for San Antonio Portland Cement Co., Cementville, Texas; two 7-ft. dia. x 40-ft. compartment mills for Northwestern Portland Cement Co., Grotto, Wash.; four 8-ft. dia. x 26-ft. compartment mills for Pacific Portland Cement Co., Redwood City, Cal., four 8-ft. dia. to 7-ft. dia. x 47-ft. compartment mills for Marquette Cement Manufacturing Co., Marquette, Mo., and one each 7-ft. dia. x 26-ft., and 8-ft. dia. x 26-ft. compartment mills for Peerless Portland Cement Co., Detroit, Mich.

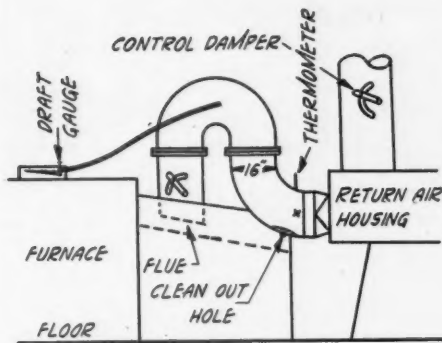
The Traylor company notes that, in building these large mills, after the head flanges are assembled to the shell the whole mill is placed in a lathe, which can take a



Two views of a new mill which grinds between inclined rollers and a table, separating the ground product by a centrifugal air separator



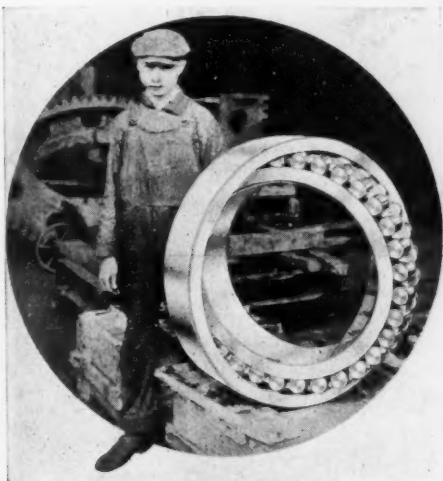
Details of a new system of grinding in heated air



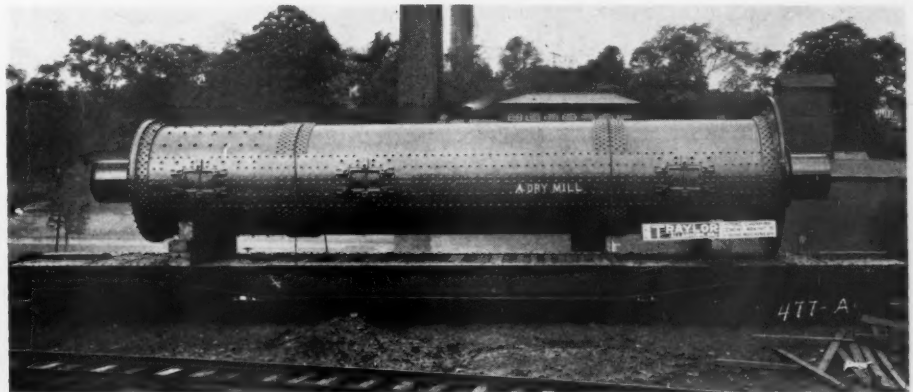
mill of any reasonable length, and the head flanges are turned true and parallel so that the mill will run true within an infinitesimal fraction of an inch.

Special attention has been given to the design of partition and discharge compartments in this year's Traylor mills, and they have been much improved from the standpoint of assembly.

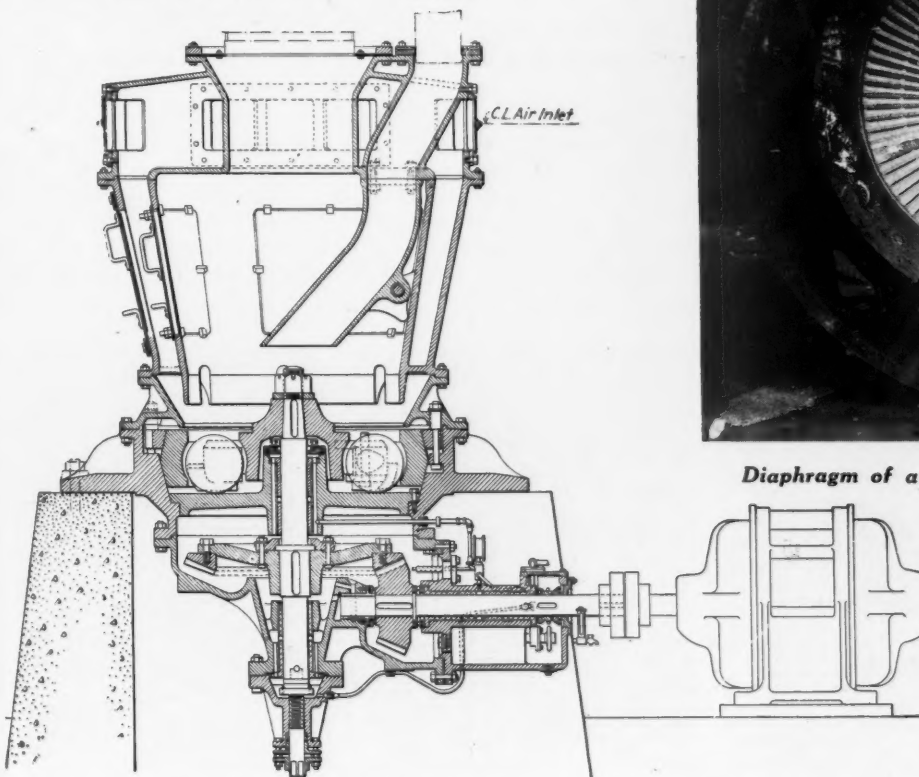
This year results were given out of three years running of an F. L. Smidth & Co. "cylpeb" mill with S. K. F. roller bearings. Their use on machines of such great length and weight looked far more of an experi-



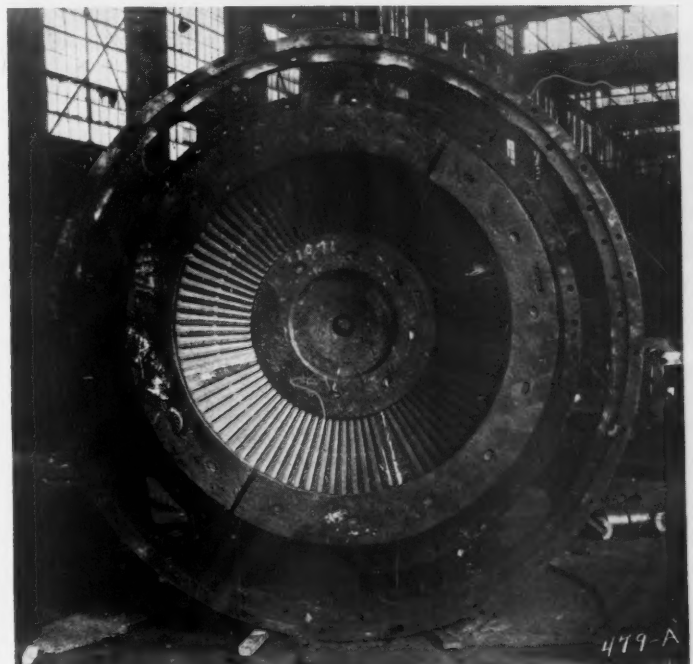
Large roller bearing after 3 years' service on tube mill



A 7x40-ft. mill being shipped to a cement plant



New type of mill having the die lowered to give rigidity, provided with roller bearings



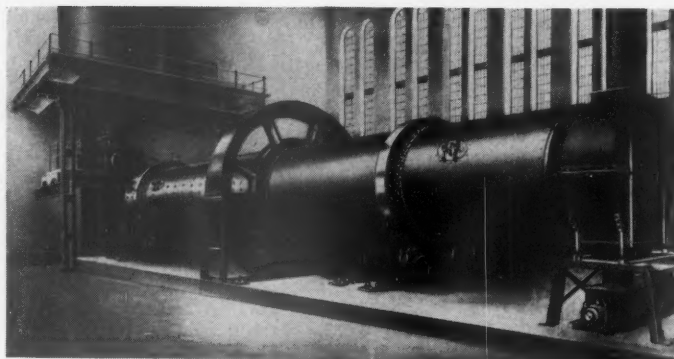
Diaphragm of a 7-ft. dia. by 45-ft. compartment mill

ment three years ago than it would today. The bearings have stood the continuous heavy service demanded of them with no more attention than the replenishment of the lubricant needed several times a year. The self-aligning characteristics of these bearings are said to adapt them particularly to this kind of service.

F. L. Smidth and Co. sold four of its "Unidan" compartment granulating and pulverizing mills to be installed in the plant of the Volunteer Portland Cement Co.,

Knoxville, Tenn.

The Polysius Corporation introduced its "solo" mill to the cement industry this year, the first installation being made in the plant of the Valley Forge Cement Co., described in *Rock Products* for October 29. This mill has a special method of returning the "grits," or oversize, from the sieves to the first grinding chamber. The grits are transported back to the first grinding chamber in such a way that they will be thoroughly ground during the second passing. Although this mill has only been recently introduced into the United States, it has been in successful use in a number of European plants.



Mill with special method of returning oversize to first compartment

The Timken Roller Bearing Co. notes that a number of crushers have adopted its tapered roller bearings during the past year. The Bonnot crusher (described Apr. 2) is one of these. Another crusher is the Gruendler crusher which was described in connection with the Dewey plant.

lowing as its products, some of which are new and were introduced to round out the line of crushing and grinding machinery parts: Slugs for grinding in all standard sizes, balls for grinding from 3/4-in. up, chrome-molybdenum steels, special chrome steels, chrome irons.

The Farrell-Cheek Foundry Co., which makes a special cast steel "Farrells 85," in the electric furnace, reports a large number of uses to which this metal has been applied in 1927. The list includes such diverse things as rollers, bucket shells and teeth, gears, idlers, car wheels, frogs, conveyor chains and buckets, screen plates concaves, jaw plates and liners for ball mills and for chutes. It notes that its application has been based on the tendency of the metal to resist stretching or flowing under impact as well as its wearing qualities.

The American Manganese Steel Co. has brought out the "Economy" dipper tooth, which it considers the last stage in an evolution of teeth with replaceable points. The feature of the design is the inclusion of so little metal in the replaceable point that the cost is less than that of removing and reforging other forms. A greater percentage of metal consumed by useful wear is also effected. At the same time the base of the tooth has been made stronger and less liable to spread under digging strains. It calls attention to the importance of keeping teeth sharp, and its tests have shown that dull teeth sometimes

Special Steels and Alloys

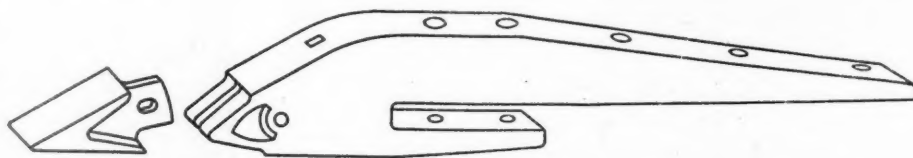
AN article on Sivyer machinable manganese steel and alloy castings was published January 8. Other improvements and innovations of the year follow:

The Coates Steel Products Co. introduced a new grinding medium made of high chromium and carbon steel, which it calls "Maxigrinders." The shape, which is held to be of equal importance with the composition, is flat with rounded edges, designed to promote greater attrition with less slippage and to carry at a high center of gravity. It is made in 3/8-in. and 1/2-in. by 1 1/4-in.

The American Manganese Steel Co. notes a very successful use of its steel in apron feeders designed by Cary C. Brayton of the American Manganese Steel Co. with the engineering staff of the Inspiration Consolidated Copper Co. Six of these are feeding large jaw crushers. The width of the platen is 4 ft. and the lengths are from 7 ft. 6 in. to 42 ft. 6 in. centers. The rollers,

links, pins and platens, the principal wearing parts, are all of manganese steel. The skirt boards, which can be easily replaced and are subject to less wear, are of chilled white iron.

The capacity of one of these feeders is



Construction details of new type of dipper tooth with replaceable point

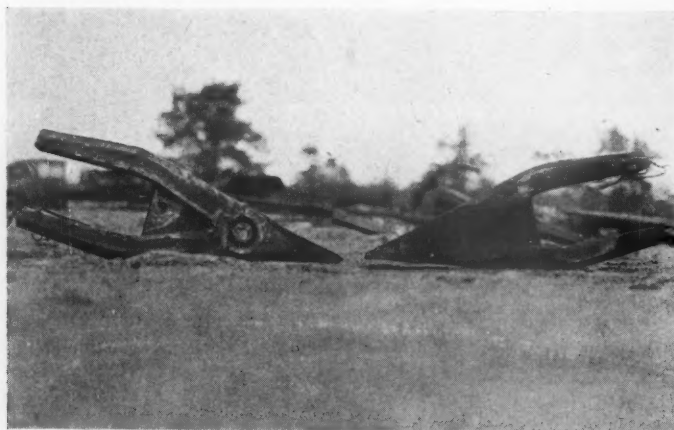
seven tons per minute, running at 20 ft. per minute, and the clear width between cheek plates is 3 ft. 6 in. and the clear height 2 ft.

The American Manganese Steel Co. is installing an electric furnace for making castings of its corrosion-resisting Fahr-alloy.

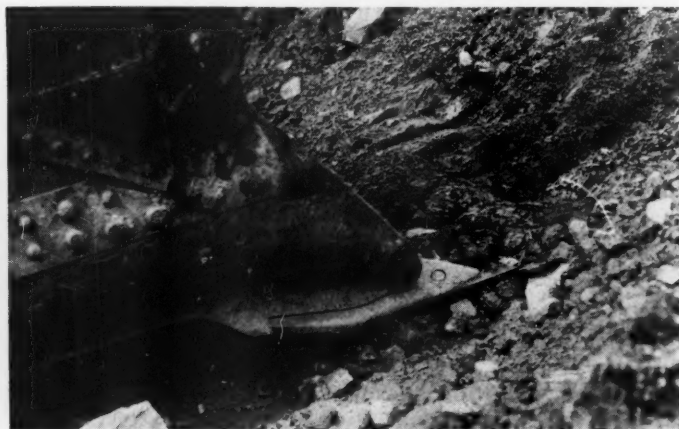
The Chrome Steel Works lists the fol-

lowing as its products, some of which are new and were introduced to round out the line of crushing and grinding machinery parts: Slugs for grinding in all standard sizes, balls for grinding from 3/4-in. up, chrome-molybdenum steels, special chrome steels, chrome irons.

require a shovel to make three passes where one pass would do with sharp teeth. The National Malleable and Steel Castings Co. developed, during 1927, a process of making "Anchor" chain cable in cast steel. This resulted from a long series of tests in mining and quarrying and it was put on the market in the early part of the year.



Left—Shank fitted with reversible and replaceable tip



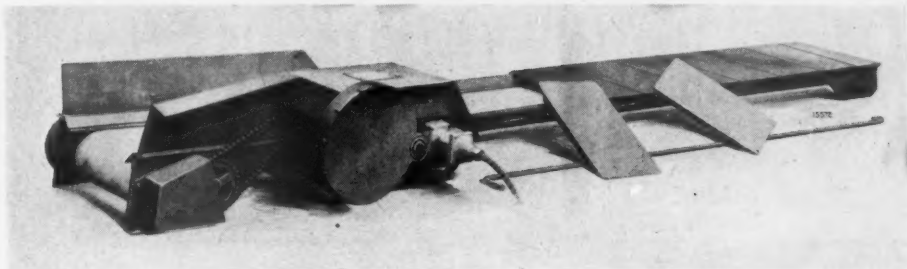
Right—Dipper tooth without the tip

Conveyors and Elevators

NEW devices under this heading already mentioned include: Goodrich rubber conveyor belt (Oct. 15); Goodrich V-type rubber belt (Mar. 5); Link-Belt anti-friction idler (July 9); Link-Belt conveyor data book (Aug. 20); "Hex-Top" compression grease cup (Apr. 16) and screw take-up of improved design (Sept. 17); Stephens-Adamson belt conveyor carrier (Oct. 29); Webster conveyor roll (Aug. 20).

The Jeffrey Manufacturing Co. has brought out a new portable scraper conveyor of lighter weight than previous models which is especially intended for handling coal in power plants, cement mills and in other industrial plants where coal storages are maintained. The 25-ft. model weighs 1100 lb. less than its predecessors, but the working and wearing parts are actually stronger. New wheels have been placed on this portable conveyor to increase its mobility, as compared with other models.

A device brought out by this company for unloading hopper bottom cars where there is no trestle or track hopper is known as the Jeffrey X-Track-Tor. It uses a specially protected belt and it can be employed where there is only $2\frac{3}{4}$ in. between the bottom of the hopper and the top of the rail. It is built to run with either gas engine or electric power and it may be used on coal, sand, gravel and crushed stone.



Unloader for hopper bottom cars where there are neither track hoppers nor trestles



Improved type of portable unloader for handling coal

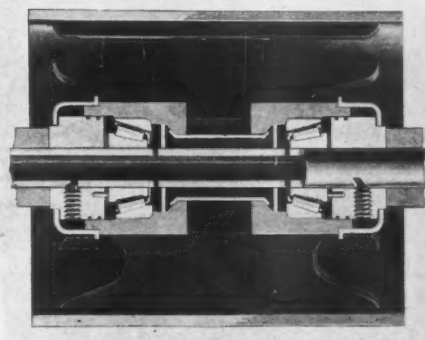
During 1927 Jeffrey belt carriers were standardized so that the same stands and bases could be used with the plain bearing, the bronze bushed and the roller bearing.

They are made with open ends because in handling sand, lime and cement the dust is apt to collect on closed end pulleys near the bearings, making extra work for the grease seals. In place of solid ends to insure rigidity of the walls three arms join the hub and roll. Between the arms, six ribs provide additional lengthwise rigidity.

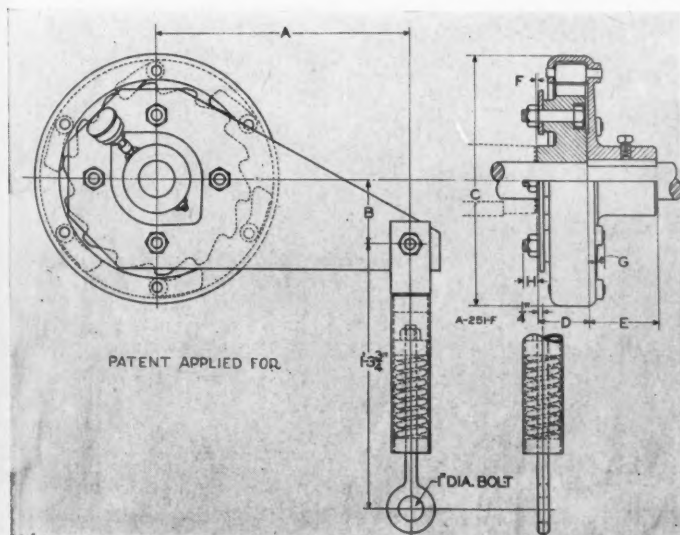
Alemite pressure lubrication fittings at the end of the hollow shaft. These pockets are very useful on long conveyors where a few pulleys are often neglected at the regular oiling. The reserve supply of grease will last until the next oiling. The labyrinth construction provides five pairs of closely jointed metal surfaces keeping powdery abrasives from reaching the bearings. In addition grease under pressure from the inside flows all dirt outward.

For bucket elevators and inclined belt conveyors carrying heavy loads of stone the Jeffrey Manufacturing Co. has developed a silent ratchet safety lock to hold the belt when the power goes off. It may be fitted on old or new installations.

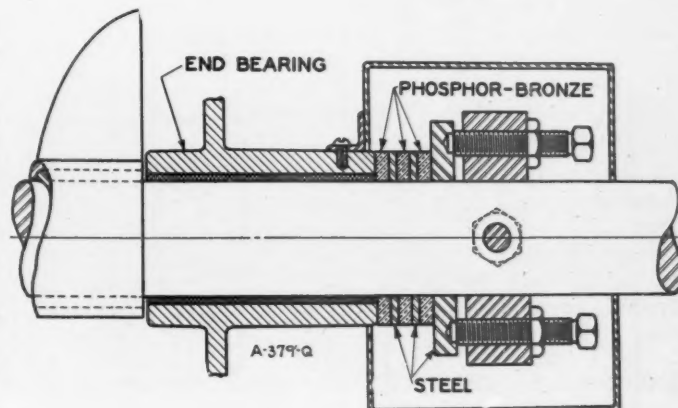
The pawls are spaced around the ratchet teeth as shown in the drawing, so that the maximum backward motion permitted by the ratchet is less than 1 in. even on the



Center pulley of new roller bearing belt carrier

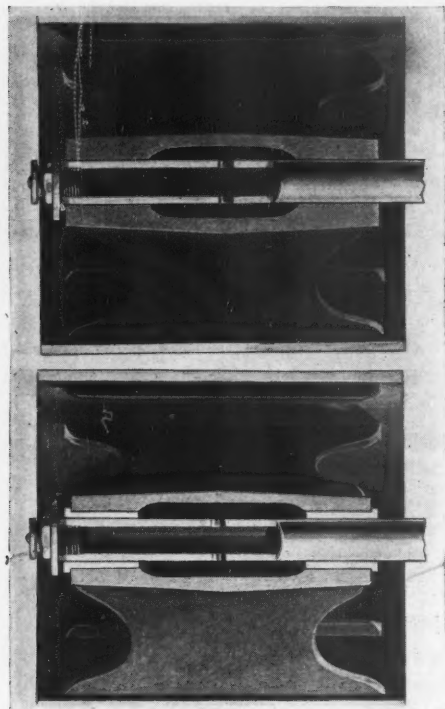


New safety lock for elevators and inclined belt carriers



Construction details of new end thrust for spiral conveyors

largest stone elevator. Another feature is the spring attachment which takes the jar out of the operation. This acts as a snubber on the arm bolted to the ratchet and when the load descends on the pawls the

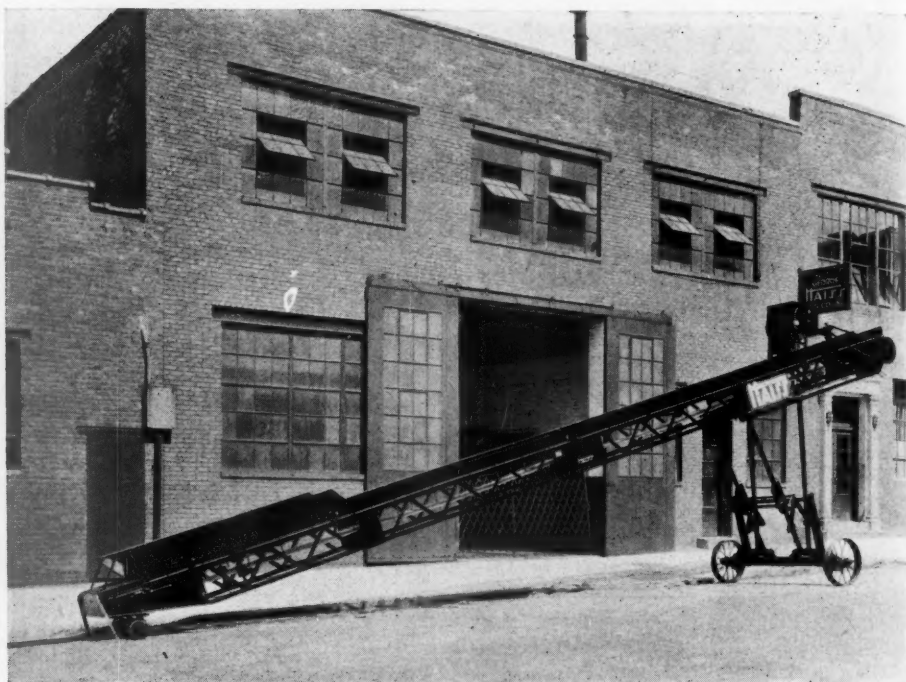


Above, plain bearing pulley, and, below, bronze bushed pulley

spring takes most of the force of the blow.

In lime hydrating plants and cement mills where long spiral conveyors carry the finished product over rows of silos a new Jeffrey thrust collar is claimed to keep the conveyor in service with little attention. On long spirals the severe wear at the thrust collar is met with three steel and three phosphor bronze replaceable washers run in oil. Their co-efficients of friction are such that they do not readily cut each other. What little wear results can be compensated for by turning the take-up bolts running through the collar.

The Haiss Manufacturing Co. introduced a brick unloader which would find use in the sand-lime brick and concrete brick industry. It is said to be 100% faster than hand unloading, reducing labor expense and the



New brick unloader for use in sand-lime brick or cement products plants

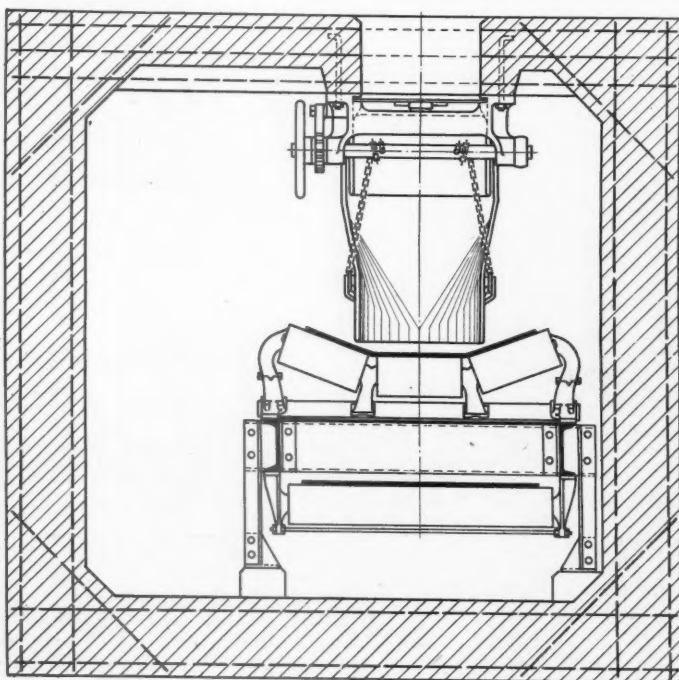
waiting time of trucks.

The Sinden box car loader, made by the Stephens-Adamson Manufacturing Co. utilizes centrifugal force to throw the material back in the car. The material is received from a hopper on a fast running belt in such a way that the fall of the material is utilized instead of checking the force of the throw. The machine is run by a 3-hp. motor, and it is mounted on wheels so that it can be easily moved from car to car.

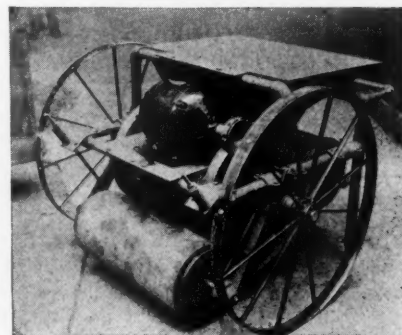
The Stephens-Adamson Manufacturing Co. made many installations of its new "Sacon" carrier for conveyor belts in the

past year. This carrier has a ball bearing arranged to take both radial load and end thrust. The enclosure is a dust tight housing, self aligning and balanced on supporting lugs. The bearings have high pressure grease lubrication and each holds grease to last for a long period. Wear is entirely confined to balls and races, renewable at small cost.

This Sacon carrier represents the final development of conveyor carriers, even more successful in its operation than the carriers made by the same company, which have given years of excellent service. Among the notable installations are several belts in the plant of the Santa Cruz Portland Cement Co. of which a number of pictures are given



Swinging spout above belt conveyor, a combined chute and gate used in bulk storage installations



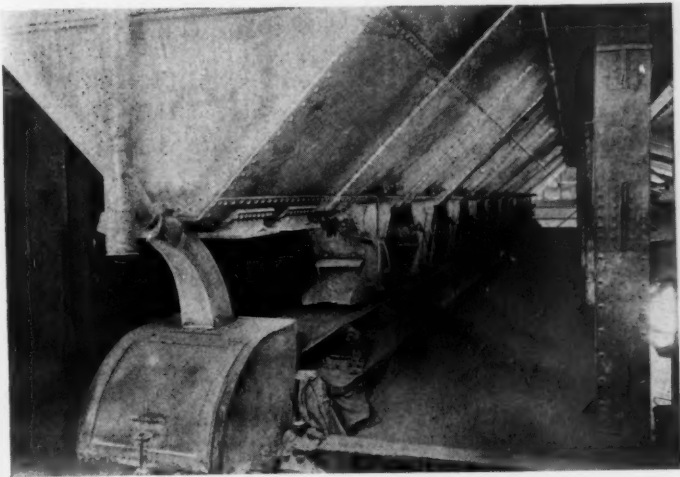
Box car loader which utilizes centrifugal force to load cars

in the text. Some of the newer crushed stone plants, notably that of Dolomite, Inc., Maple Grove, Ohio, have belts with this type of carrier.

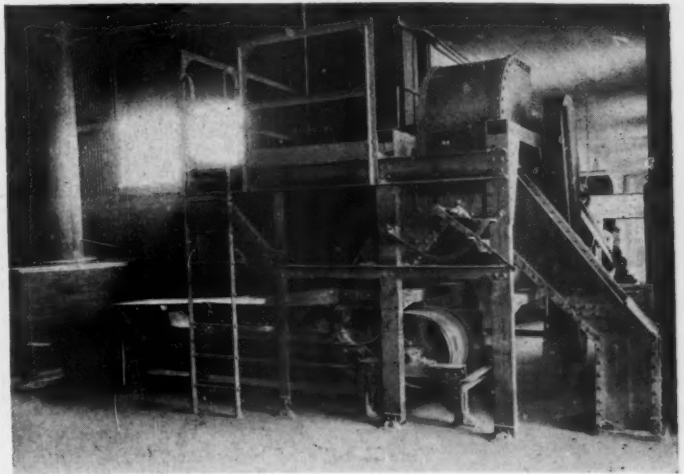
Long Conveyors

Publication of the results on one of the longest conveyor installations ever made gives some interesting comparisons to the user of conveying machinery in the

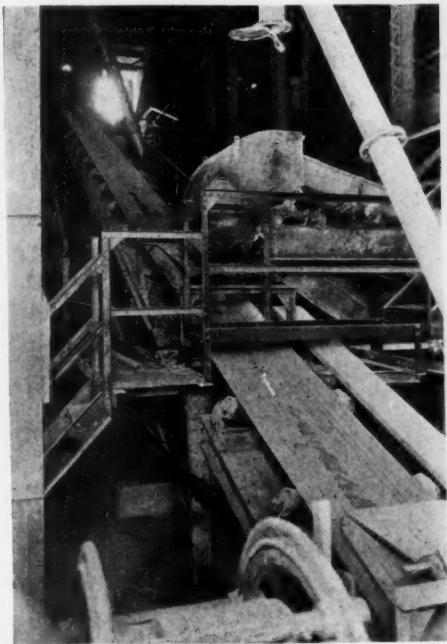
Improvements at the Santa Cruz Portland Cement Co. plant, Davenport, Calif.



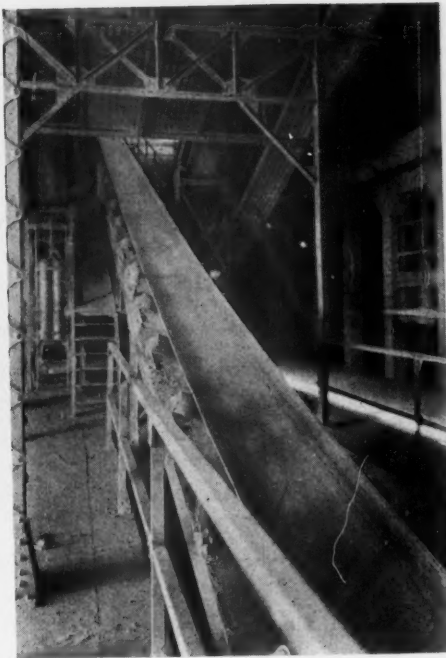
Belt under bins. Note dust-collecting pipe



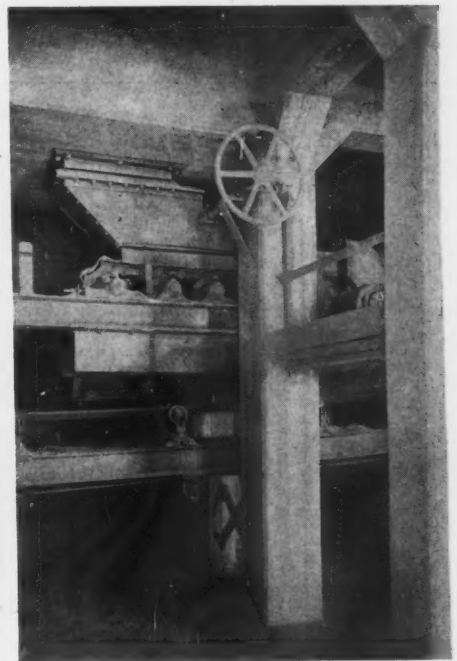
Proportioning device placed over conveyor



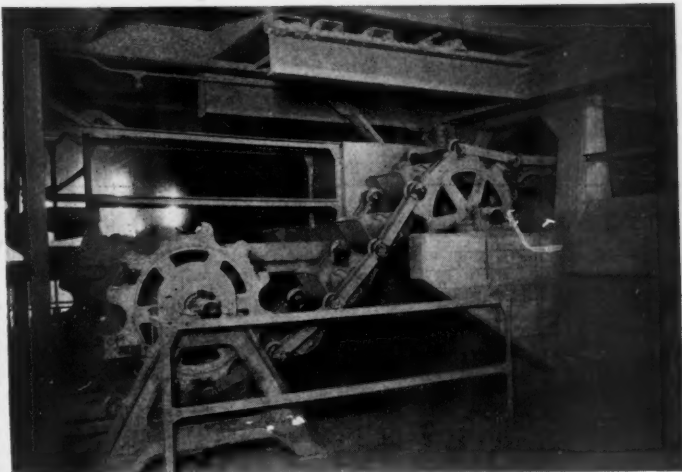
Union with cross conveyor



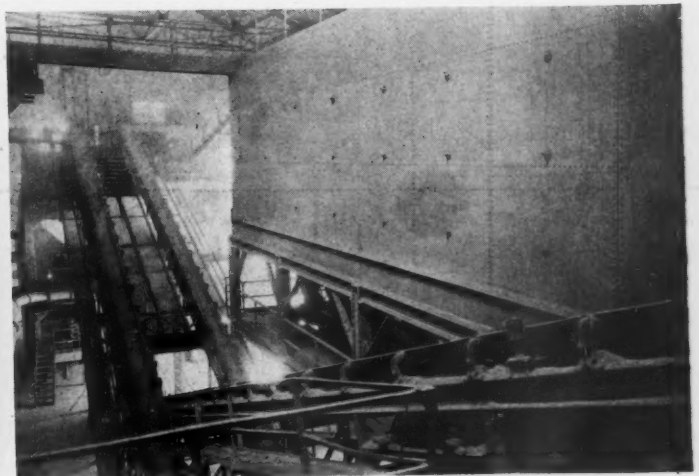
Inclined conveyor to upper floor



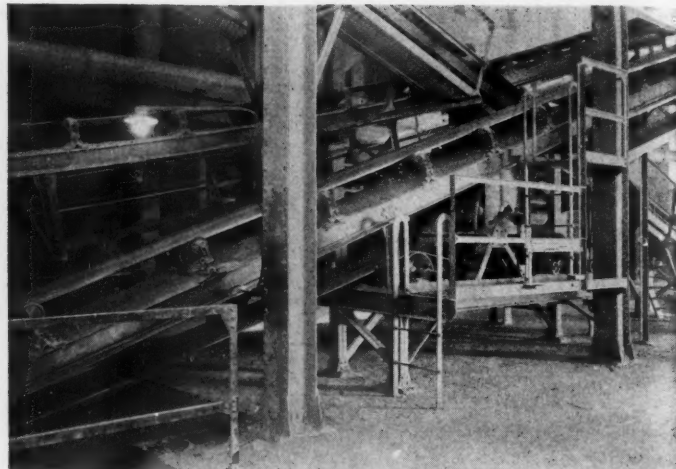
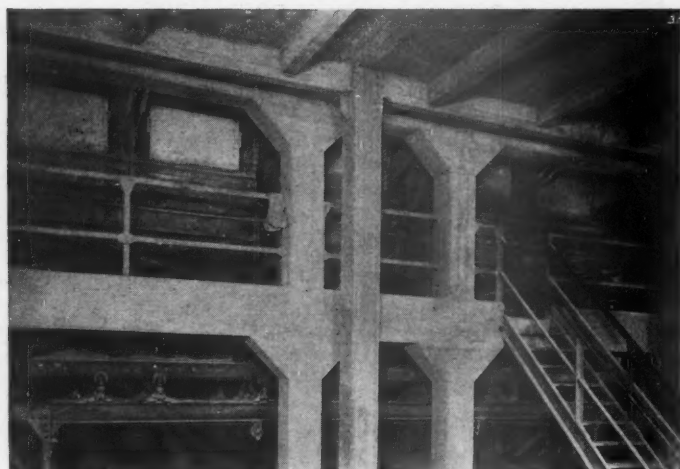
Conveyor and weighing device



Changing elevation of a carrier conveyor



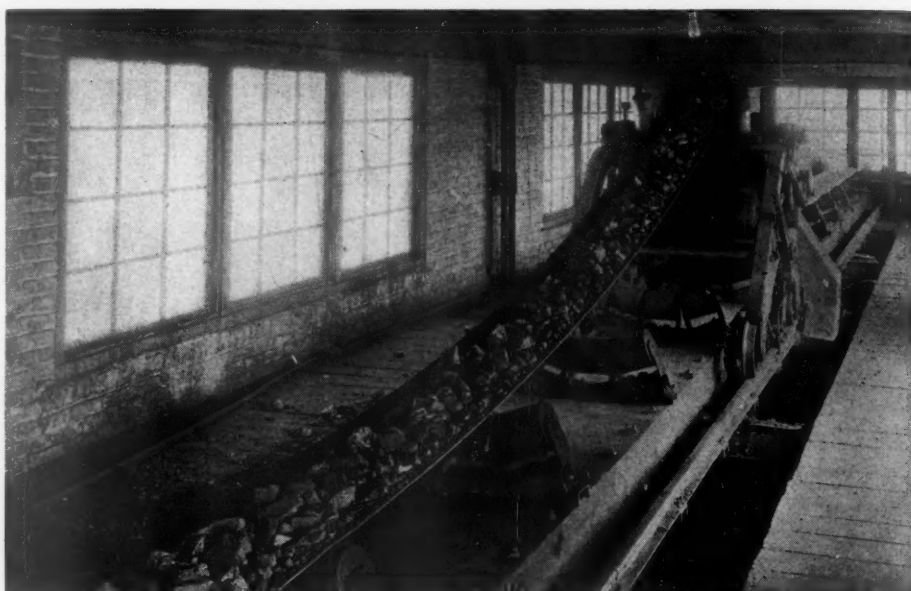
Details of idlers and supports



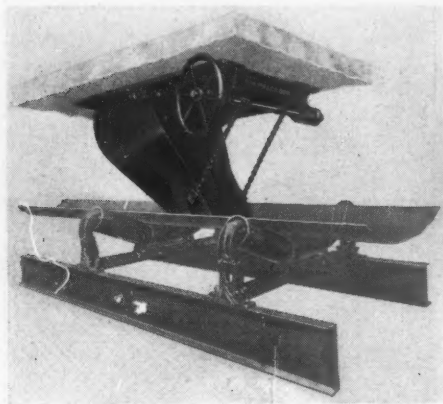
Two details of conveyor installations in Santa Cruz Portland Cement Co.'s plant

rock products field. In the December 17 issue of *Engineering and Mining Journal*, is a report of four years service of the 4 1/3 mile conveying system of one of the N. C. Frick Coke Co.'s operations. It consists of 20 conveyors totalling 22,930 ft. all made by the Stephens-Adamson Manufacturing Co.

It has conveyed 9,390,619 tons of coal with only 45 3/4 hrs. delay, and 57% of the original belting is still in service. The



Conveyor with tripper used in distributing to storage bins

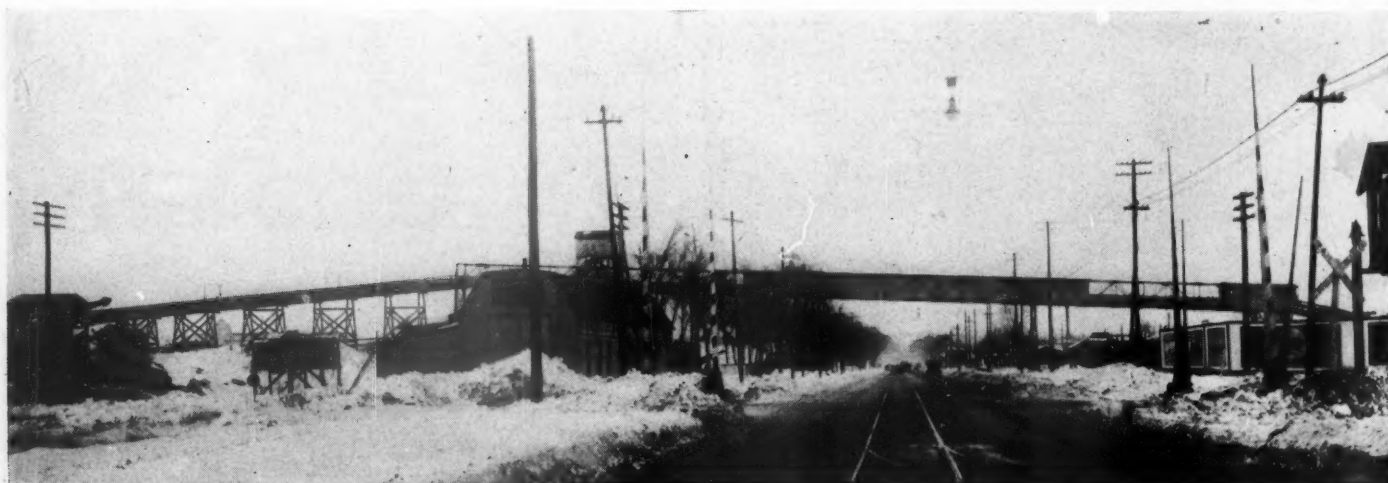


View of swing spout used with belt conveyor as gate and chute

principal change that has been made is that flat pulleys are used instead of crowned pulleys, improving the running and lengthening the life of belts. The operation has

been found cheaper than trains.

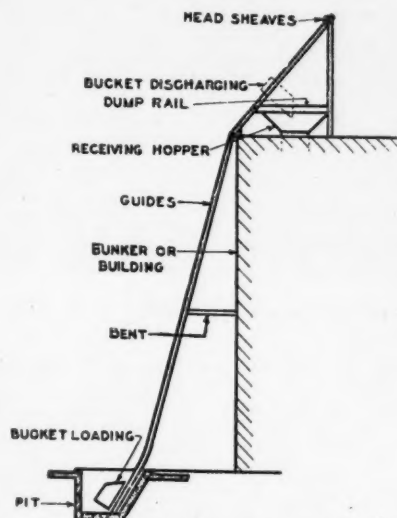
The operating company is now installing conveyors totalling 15,280 ft., with a total lift of 280-ft. to deliver 12,000 tons per day.



Conveyor installation over a city street which is "humped" to allow locomotive crane to pass

Link-Belt developments for 1927 have been covered in the new machinery department as they appeared. One of the most interesting installations made by this company is the long conveyor over Snelling avenue, St. Paul, shown here. It is described in detail in this issue in the review of the sand and gravel industry.

The Beaumont "Skip-Lift," made by R. H. Beaumont and Co., although it is well known in other industries which have similar material handling problems, was introduced in the rock products industry this year. It



A lift passing over two angles

takes the place of elevators and the makers claim it is more advantageous than these under certain conditions, notably the handling of large pieces, wet material and where lessened breakage is important. It may be applied to the charging of lime kilns, the handling of clinker, the filling of silos with gravel and crushed stone and the placing of materials in storage.

It is made in three forms, the automatic, semi-automatic and manually controlled. In the automatic form it works without attendance, the cycle of filling the skip, hoisting it and discharging it being repeated as long as there is material to be hoisted. In combination with an automatic tram car it may be used to raise the material and deliver it to any one of a row of silos or to stock piles, the entire operation being performed without attendance.

It consists of a self-dumping skip running in guides which is raised and lowered by a hoist. In the automatic form the cycle is started by pressing a button and continues until the "stop" button is pressed. In the semi-automatic each trip is controlled by the start and stop buttons. In the manual type the hoist is operated by a controller for elevating and discharging, although one man can perform all the operations.

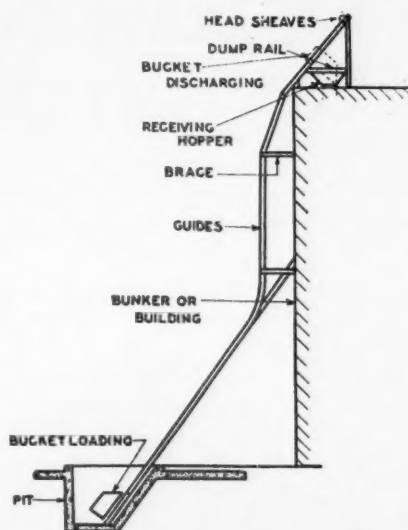
A remarkable feature of the skip-hoist is the number of unusual situations to which it may be adapted. The path does not have to be straight, as the bucket can pass over considerable angles in the guides. A number of different installations are shown here in



Lift used for changing kilns or filling bins

line cuts, and also diagrams of the paths to which it may be adapted.

For installation where there is no building or other structure to which it may be attached, the "skip-lift" is made with the guides in a simple self-supporting tower.



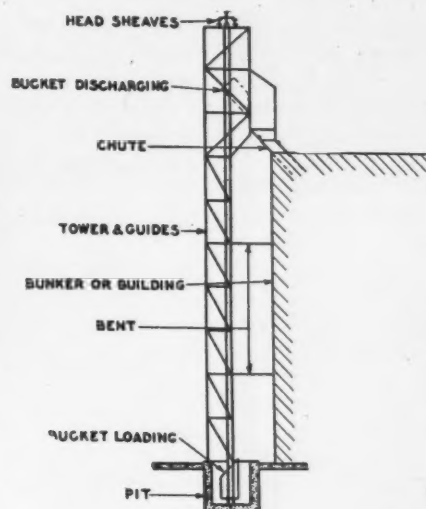
Lift passing over edge of wall

Quantity Storage of Bulk Materials

By C. H. ADAMSON

Secretary, Stephens-Adamson Mfg. Co.

THE evolution of plant operation and the resulting requirements in the supply and demand both of raw material and processed products has led the industry into the study of quantity storage methods. This subject is one upon which an elaborate treatise might be prepared but in this limited space the writer only wishes to bring to the at-

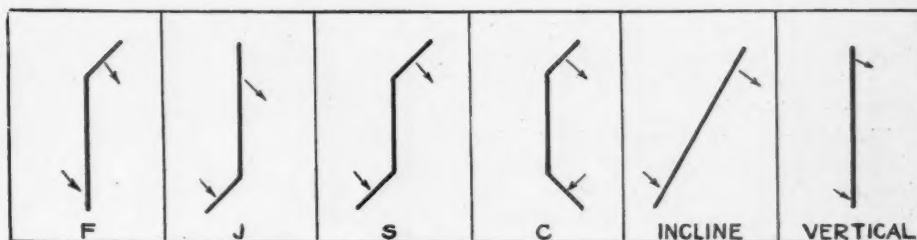


Vertical application of lift

tention of operators some of the primary points.

For example, take stone products. It seems that there is a necessity for bulk storage ahead of the final crushing and processing operations in the plant. This is necessary to insure an even operating curve for the finishing department. Again, there is the necessity for bulk storage after the material has been processed. This is necessary to make it possible to deliver immediately upon receipt of order.

Companies are at an advantage when they can ship at once and not be required to wait to manufacture. There is also a necessity for the wholesaler or retailer to store material. As is the case many times, the source of supply is far distant from the retail market and retailers are also at an advantage if they can furnish immediately upon receipt of order. This angle of the problem requires that there be storage at the point of consumption from which the retail buyer can secure immediate shipment.



Various paths a lift may follow

BEAUMONT • 2562

The actual consumer cannot disregard the advantages of bulk storage. If the consumer is a large user of any certain class of bulk material it is essential also for the consumer to have a supply of material on hand ready for instant use.

Bulk Storage Between Off-Season and Demand Season. This condition is common to many industries where the market requires large volumes of finished product at certain times of the year only and necessitating storage facilities both for raw and finished products.

Bulk Storage Ahead of Car Shortage. There are definite seasons when the car shortage is especially noticeable, although this is usually most apparent in certain areas. Adequate storage of materials to provide sufficient supply throughout these days when railroad cars are not supplied at a moment's notice will eliminate anxiety. A large storage of materials will furnish sufficient supply over the car shortage stage.

Bulk Storage Tides Over Time When Navigation Is Closed. There are any number of industries dependent upon materials transported by water. The supplies can only be secured while the season is open and ships may ply regularly. This condition actually demands adequate storage which will provide a sufficient supply to carry through the closed season when navigation is closed.

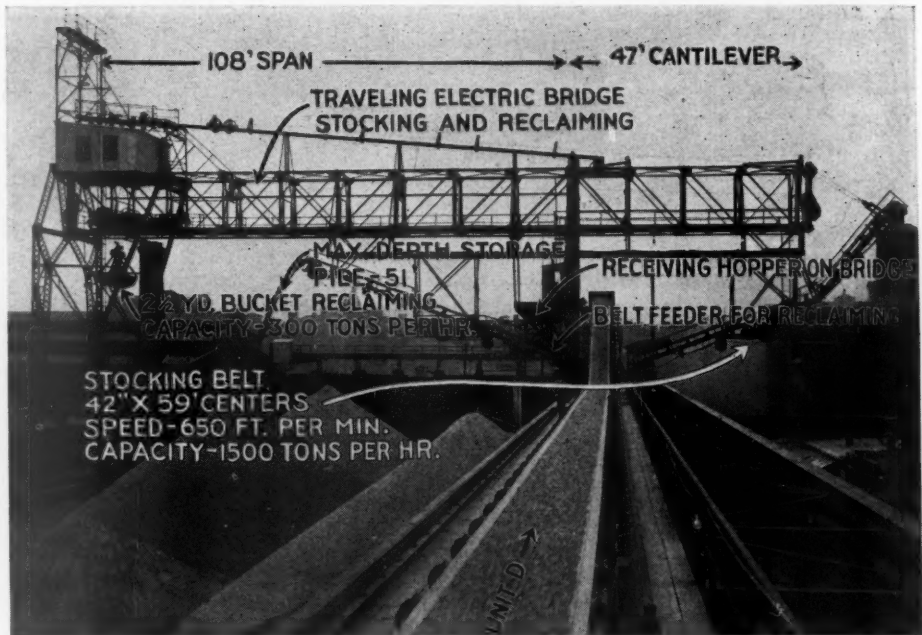
Bulk Storage Will Take Uniform Production Supply Where the Demand Is Irregular. There are cases where the production processes are regular and uniform and the demand is spasmodic. This condition will allow large supplies to pile up before the demand arises. There is also the case where the production is carried on according to a regular schedule and demands of the market require quick delivery of a large quantity representing weeks of production. Large storage facilities care for these emergencies.

Bulk Storage Between Primary Production and Varied Final Processes. Some industries have the primary function of producing certain raw products with regularity. The final processes, however, are variable as to time and quantity required. These conditions therefore demand a provision for storage in large quantities to balance the interval schedule.

Bulk storage is the means of providing that balance in material handling to keep all processes in balance.

Bulk Storage to Create Sufficient Supply for Rush Peak Demands. It is strangely true that many commodities which are produced at a low uniform rate are the ones which are required by high peak delivery demands. The one way to have a sufficient supply to meet the peaks of requirement is through storage provision.

The belt conveyor has unquestionably led the advance in the storage field of material handling. Its universally satisfactory operation under many conditions and its large tonnage capacity with relatively low operating and maintenance costs stamps it as the



Typical bulk storage plant for a large scale operation

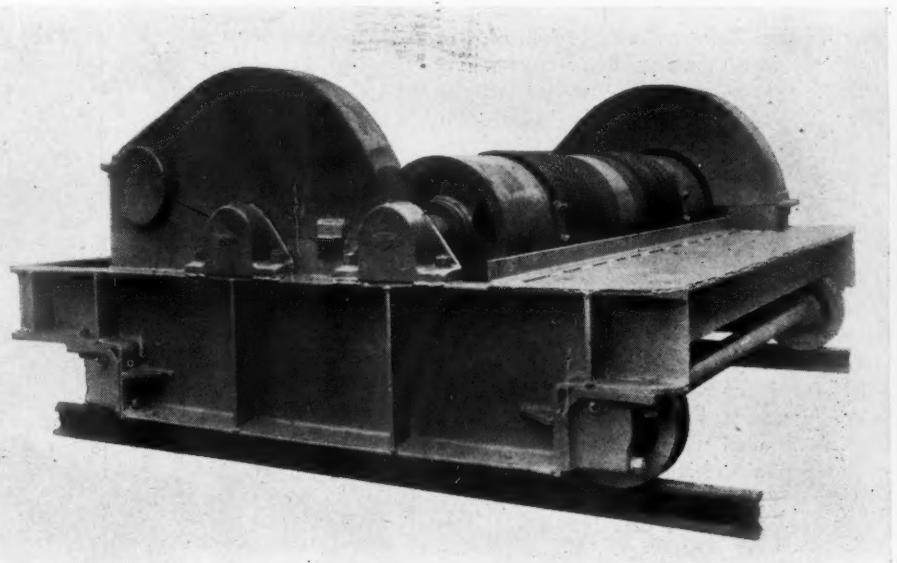
outstanding equipment for this service. The belt conveyor is equally successful in both the storing and reclaiming of bulk materials. There are always, of course, certain practical limits to the heights to which materials can be successfully stored, yet the quantities are only further limited by the areas which can be given over to the actual storage piles.

In summarizing the various items which rather demand the consideration of bulk storage between certain definite phases of production and operation, there is plainly displayed the ever present problem of supply and demand. It is with the idea of suggesting that sufficient consideration be given to the many desirable features of bulk storage that these points are presented.

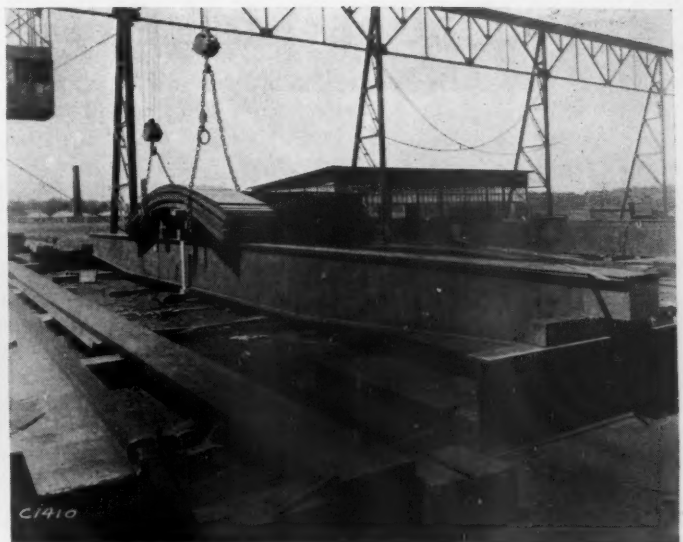
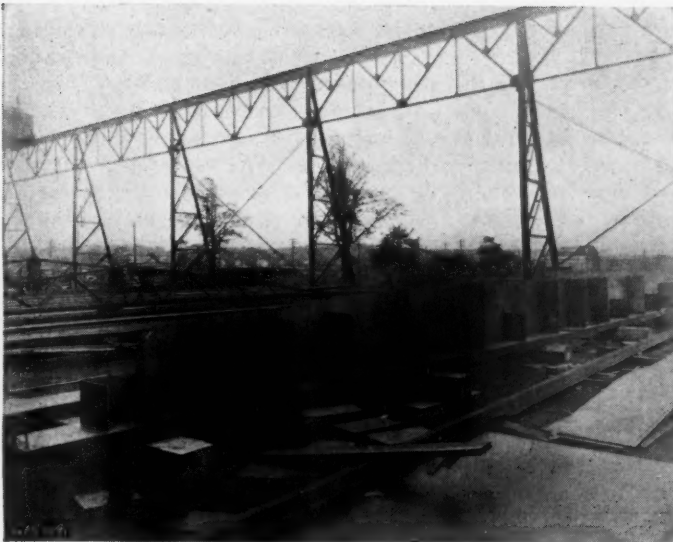
Travelling Cranes

A DECIDED innovation in traveling cranes was brought out in 1927 by the Cleveland Crane and Engineering Co. The design does not particularly differ from the other cranes made by this company, so far as operation goes, but the construction is quite novel, as it is built by arc welding. This is

now so recognized a method of joining heavy structural units that it is no experiment, and its use in crane construction has been found, as in other work, to give greater rigidity and strength with the same weight of steel. This has permitted a higher safe speed for both trolley and bridge travel, increasing the



Lighter mechanisms and less power possible with arc-welded cranes



Two views of constructing a crane by arc welding

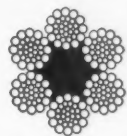
efficiency with a lessened power consumption.

Many tests were made of the first cranes of this construction which showed that they were so much stronger that lighter plates might have been safely employed. But the thickness of metal has been kept the same, giving an added factor of safety.

The crane has been made in the arc welded type in the 10-ton, 60-ft. span size, but it is thought from the performance of this crane that the method is adapted to building cranes of any size.

clamshell equipment. Of the new rope the manufacturers say:

"Our special 6x31 construction is much more pliable than 6x19, yet the outside wires of each strand of the 6x31 are the same size as the outside wires of 6x19 and therefore will stand considerable abrasion. In other words, this special rope combines flexibility with the wearing quality of the 6x19 rope."

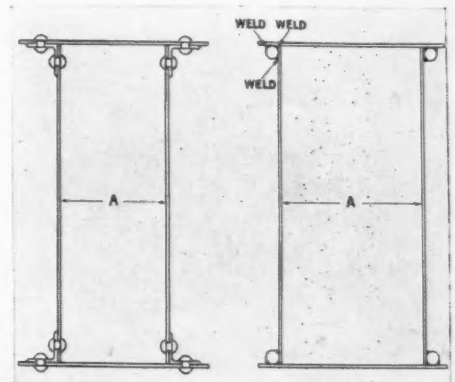


New type of wire rope

New Sheave Block

A new type of sheave-block of heat-treated alloy steel designed specifically for drag scraper and slackline cableway duty has been brought out by Sauerman Bros., Inc., Chicago. Lightness and strength are among the features claimed for the new block, of which there are two models, bronze bushed bearings and roller bearings. The bronze-bushed blocks are manufactured with sheaves

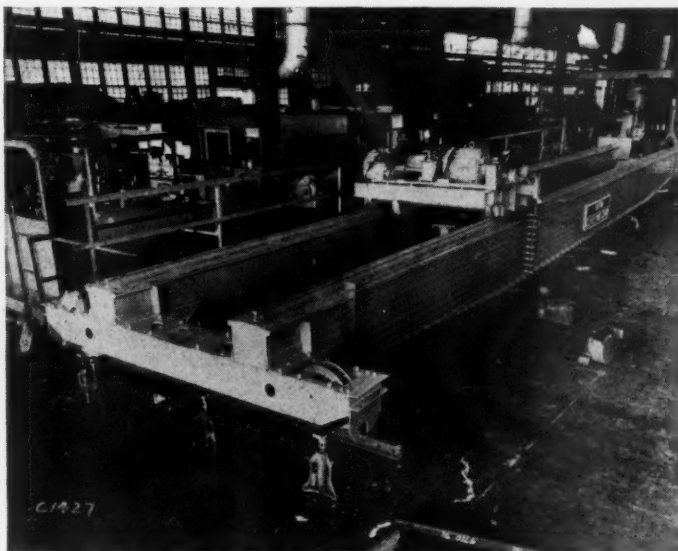
of 12-in. dia. and up, while the roller-bearing blocks come with sheaves of 16-in. dia. and up. The blocks are furnished with either a pin-bearing swivel eye, a rope-bearing swivel eye or a swivel hook.



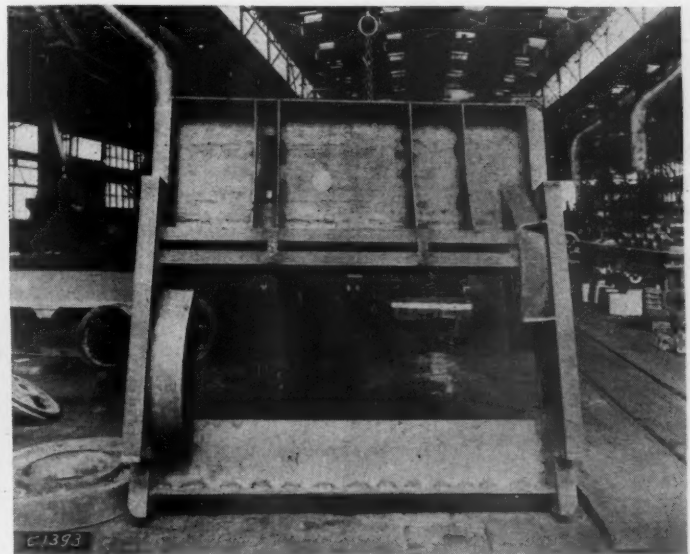
The diagram shows how the structural plates were joined by arc welding

Wire Rope and Accessories

A SPECIAL construction of wire rope has been designed by Broderick and Bascom Rope Co., St. Louis, Mo. The new type is called 6x31 and comprises six strands of 31 wires each, with either a manila core or a special wire rope center. The rope is specially intended, according to the manufacturers, for power shovels, derricks and



The arc-welded crane set up in the shop for testing its strength and for inspection



Showing how rigid construction is obtained by arc welding and ribbed bracing

Screens and Washers

MANY improvements in screening and washing have been made this year. Screening practice shows a decided tendency away from the revolving screen to the vibrating screen and the live roll machine. Washing has grown in importance as the washing of crushed stone becomes more common. Articles published during the year include: Dorr traction type thickener (Aug. 20); Galland-Henning rollerless rotary screen (Aug. 20); Norwood vibrating screen (Oct. 15).

In grizzlies the live roll type has been very successful. The Stephens-Adamson Manufacturing Co. brought out such a machine which it is building in large as well as small sizes. One which has a 6-in. round opening is in successful use in the plant of Dolomite Inc., Maple Grove, Ohio. Several of sizes down to 1½-in. opening are in use in the same plant. The freedom from vibration, the low power requirement and the minimum of breakage are advantages of this device which are appreciated by plant operators.

The machine is made in widths of 24-in.

to 60-in., capacities ranging from 120 to 270 tons per hour.

The new screen introduced by the Sturtevant Mill Co. in 1927 was named the "Ham-mock" screen, and the name is quite descriptive. The wire is stretched by springs, lengthwise, to take up the sag, and a vibrator is placed under the center of the cloth where it will vibrate only the cloth. The idea in designing it this way was to remove as much weight as possible from the vibrating mechanism. There are no screen frames, the reinforced wire being simply hooked on. By releasing the spring tensions the wire may be unhooked for renewal. The vibrations are transmitted by a roller bearing eccentric.

The screen is enclosed in a vibrationless tight box with hinged cover. The feeding mechanism is attached to the box. The separation of products is made at the bottom and the machine is ready to run when received. The cut shows the simplicity of this device.

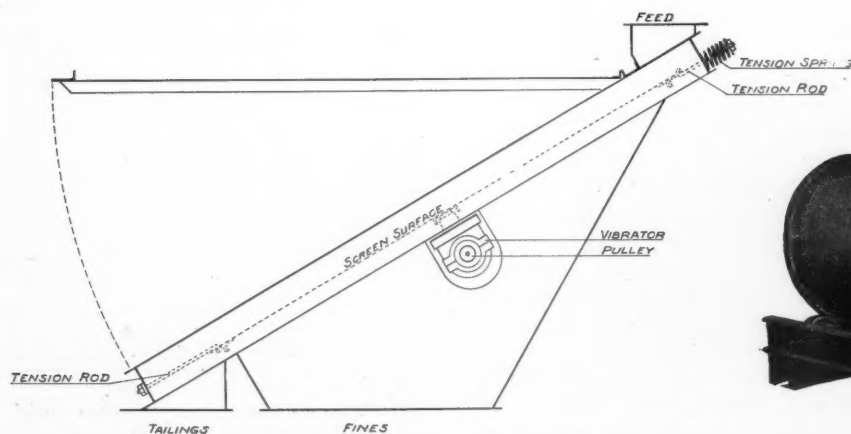
In vibrating screens two entirely new forms have been developed. One of these,

the Telsmith vibrating screen, made by the Smith Engineering Works, is quite unique in its appearance. It consists of a conical hopper supported on legs, in which there is a circular screen frame that is revolved and given a vertical vibrating motion at the same time. While the vibration screens the material, the circular motion works the material from the center outwardly, and finally discharges the oversize around the edge, owing to the centrifugal effect. The path of the particles is a long spiral, giving plenty of opportunity for the fines to be shaken through. This action also assures all the screen area being active.

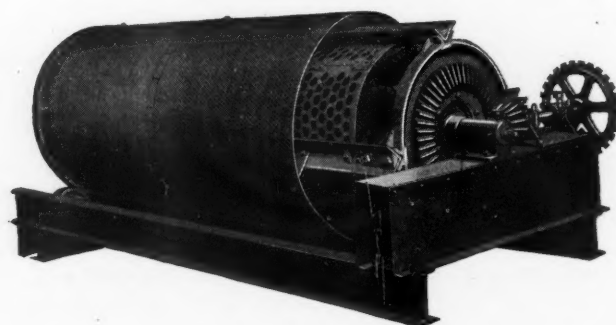
A slight dishing action is given the screen to prevent the coarser particles from gathering too much momentum and moving too rapidly as they approach the edge.

The vibrating mechanism is a live shaft and an idler shaft connected by gears. Each carries disks on which weights are bolted to give an unbalanced effect. The weights are placed to counteract each other for lateral vibration but to reinforce each other for vertical vibration. There are 850 vibrations and 23 revolutions per minute imparted to the screen.

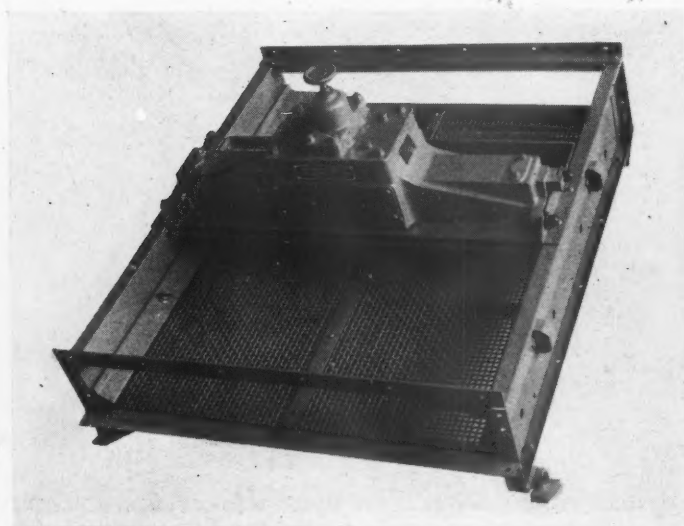
Another new screen is the "Gyrex", made by the Robbins Conveying Belt Co. The makers say that it is neither a shaking screen nor a vibrating screen, lacking the sluggishness of the shaker and having the speed of the vibrator which is necessary in



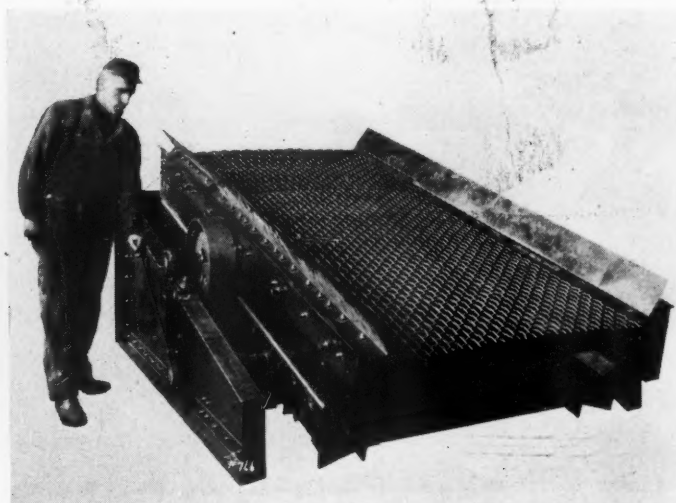
A screen in which only the fabric, stretched by springs, vibrates



A washing screen of a new type with deep baffles



A small form of a well-known electrical vibrating screen

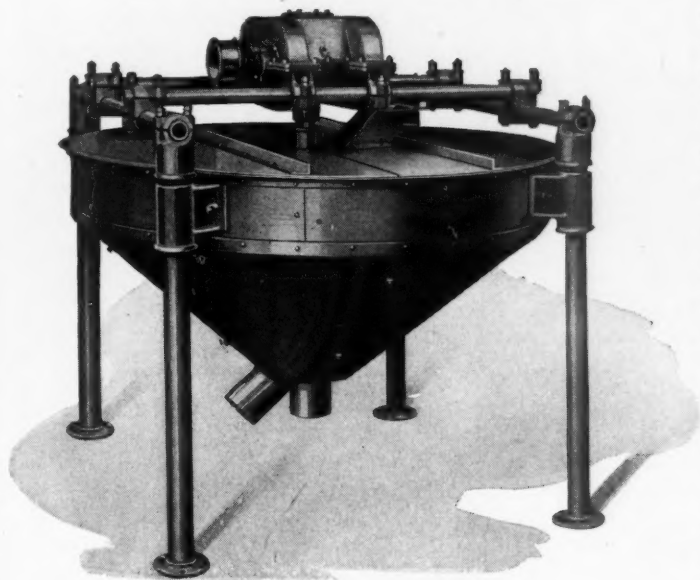


One of the newer vibrators adapted for coarse and fine work

screening fine materials. It can handle all sizes of screens from 3-in. openings down to $\frac{1}{8}$ -in. openings, it is claimed.

Some other advantages claimed for it are: silent running, balanced running, adjustment while running and accessible attachment of screen cloth by which quick replacements are made possible.

The Universal Vibrating Screen Co.



New vibrating screen which uses centrifugal force to carry the material over the fabric

brought out Type C of its well known vibrating screen. It is a light, compact machine of very sturdy construction and has the special feature of Universal screens that has made them so popular, the ease with which the screen cloth may be changed. Two or three of the important stone crushing plants of the year installed batteries of these screens.

The Diester Concentrator Co. is making important improvements in screening equipment and calls attention to the distinctive type of vibration given by its Type B screen. Diagrams sent by them show that the snap of the screen jacket at the height of the amplitude of the stroke clears the meshes of any fines that may have become wedged in them. It is also shown that stratification of the material is accomplished in 19% of the stroke leaving 81% of the cycle for the fines to sift through, with the least disturbance of the stratification, the fine material continuing to remain below.

Several installations of the Traylor Vibrator Co.'s screen, introduced in 1926, were made, including one at the Monroe plant of the France Stone Co.

The Rotex sifter, made by the Orville Simpson Co. has been put out in a new form this year. In its heavy duty type it has placed two balance wheels, one with a light weight and one with a heavy weight, which can be adjusted so that opposed forces cancel out at every portion of the stroke. The system of balancing with a

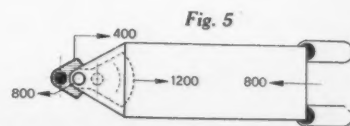
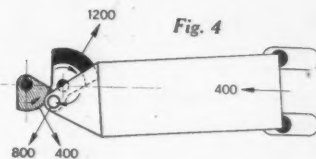
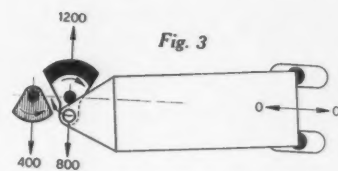
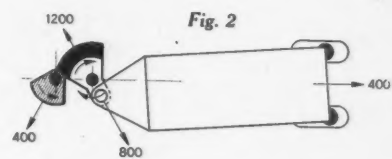
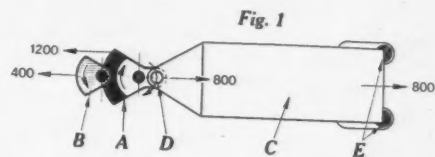
single balance wheel and weight was in the nature of a compromise, and it works very satisfactorily with screen boxes weighing up to 300 lbs. With the doubled balancing there is no trouble, and models with screen boxes weighing 1300 lbs. have been constructed.

The Rotex sifter is a gyrating screen which has rubber balls in compartments below the screening surface. There are a number of them in use in rock products plants covering almost every branch of the industry. An installation in the new Monroe plant of the France Stone Co. is used in connection with washing the stone. The new heavy duty type was placed on the market in May, 1927.

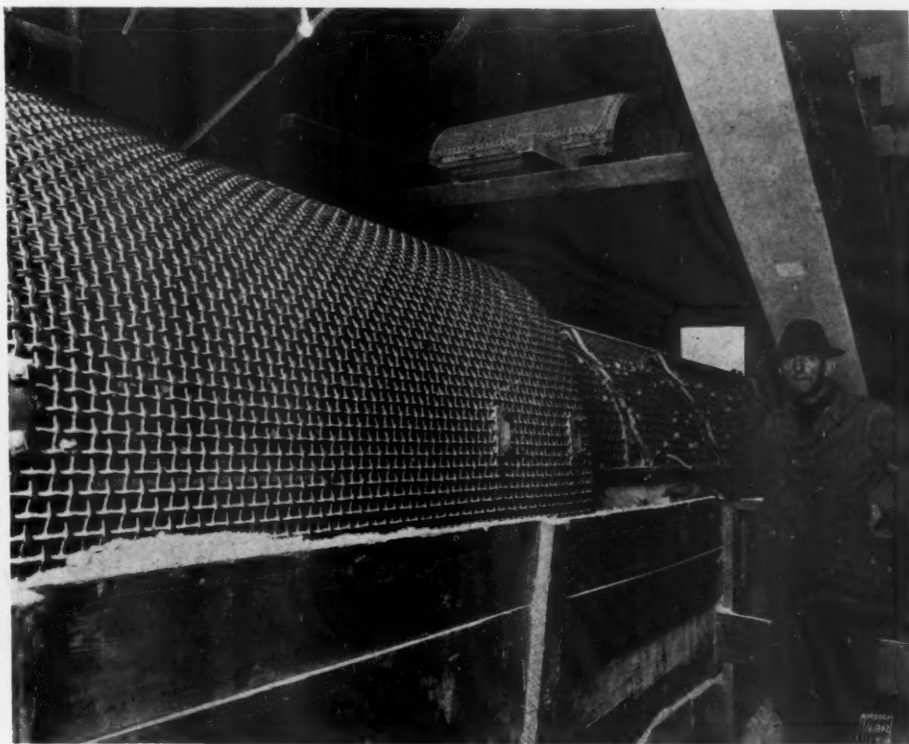
Roll - Man-manganese forged steel screens are finding an increasing use in crushed stone and gravel plants owing to the increased capacity that they may give a revolving screen originally covered with punched plates. The screen woven of manganese steel rods has a much higher percentage of screen opening and consequently more material can get through, the makers say from 30% to 50%.

Installations to replace punched plate

have been made in a number of plants and the makers give the following as an ex-



Showing how strains "cancel out" on a gyrating screen



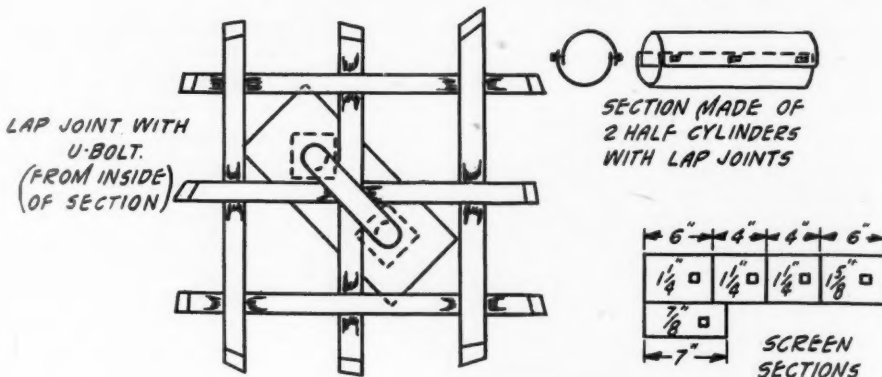
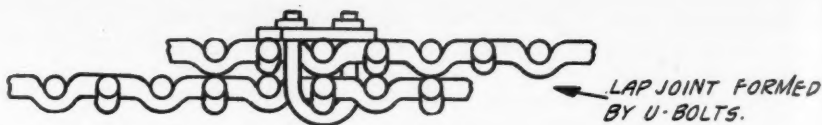
Manganese steel rod screens applied to stone screening

ample, the screen being one that is in a Wisconsin crushing plant: 6-ft. section with 1 1/4-in. square free openings, 1/2-in. rods; two 4-ft. sections, 1 1/4-in. square free openings, 1/2-in. rods; one 6-ft. section, 1 3/8-in. square free openings, 1/2-in. rods. Jacket, 7-ft. long, 7/8-in. square free openings, 3/8-in. rods.

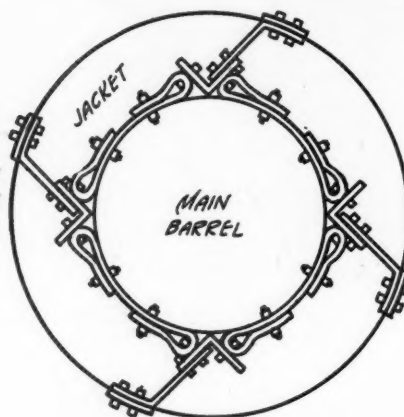
These screens are available in sizes from 3/16-in. square openings, made of 3/16-in. rods to 8-in. square openings and larger made of 1 1/4-in. diameter rods. Several 4-in. and 6-in. opening screens were installed during the year.

The W. S. Tyler Co. brought out a new Hum-mer screen, Type 27. While it is claimed to be just as efficient as other Hum-mer screens it sells at a somewhat lower price as less equipment and attachments are required. A small generator, especially adapted for single units, operates this type. It is particularly adapted to installations where the output wanted is less than would be obtained by the larger sizes of Hum-mers.

The Roberts and Schaefer Co. are bringing out the "Arms" horizontal screen, adapted to the rock products industries. This company has made screening and sizing equipment for the coal industry for a good many years. In its literature it calls attention to the advantages of horizontal screening in which the material is moved by the motion of the screen and not its slope. One of these is that the full opening of the screen is always available, which is not the case with an inclined screen. Al-



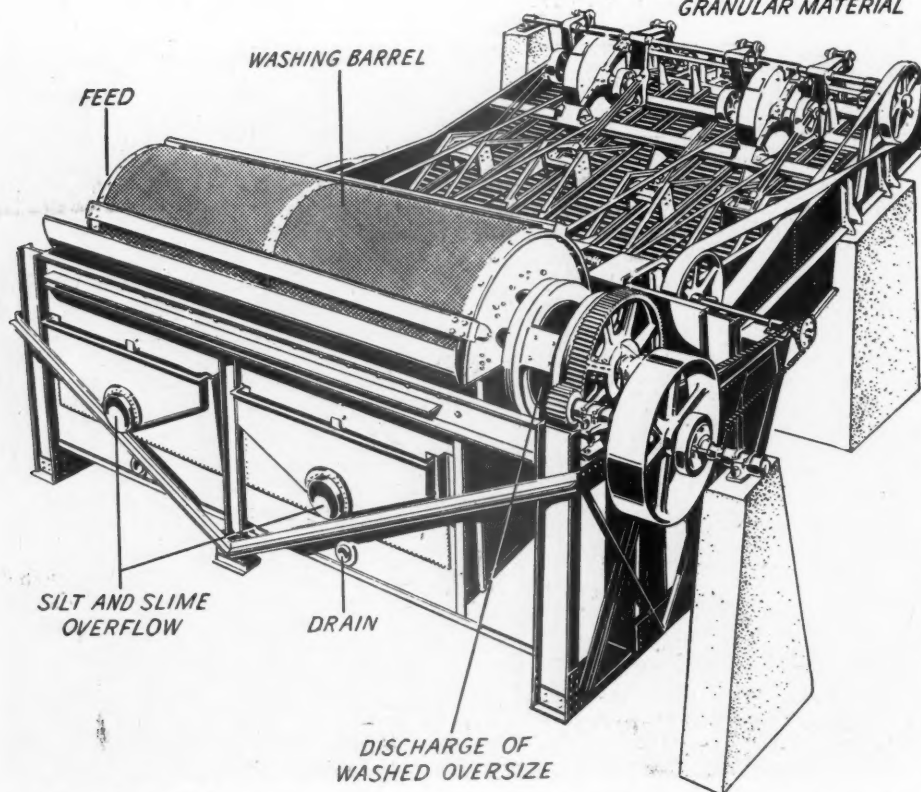
ALLIS-CHALMERS
20'-0" x 4'-0" REVOLVING
SCREEN EQUIPPED
WITH ROL-MAN



SCREEN FRAME

RAKE DISCHARGE OF
WASHED AND DEWATERED
GRANULAR MATERIAL

Application of manganese steel rod
screens in a crushing plant



A washer which separates sand from gravel and washes and rinses both products

though this machine is new to the rock products industry it has been thoroughly tested in the coal industry where equivalent work has to be done.

The Swintek Screen Nozzle Co. has been bought by the Eagle Iron Works, which will continue the manufacture and sale of the Swintek machine. Many descriptions of it have been published in *Rock Products*. The Eagle company also makes a washer for removing mud, trash and lignite from sand and gravel.

The McLanahan-Stone Machine Co. found new applications for their washer in the sand and gravel industry. One of their double steel washers was installed by the Commonwealth Sand and Gravel Corp. of Richmond, Va., and succeeded in making a clean commercial product from bank material which some other devices had failed to wash.

The Traylor Engineering and Manufacturing Co. has brought out a scrubber which is built of standard tube mill design with heavy proportions and large baffles for a thorough cleansing of the material.

Washing Machinery

One washing machine new to the rock products industry is the Dorr washer, made

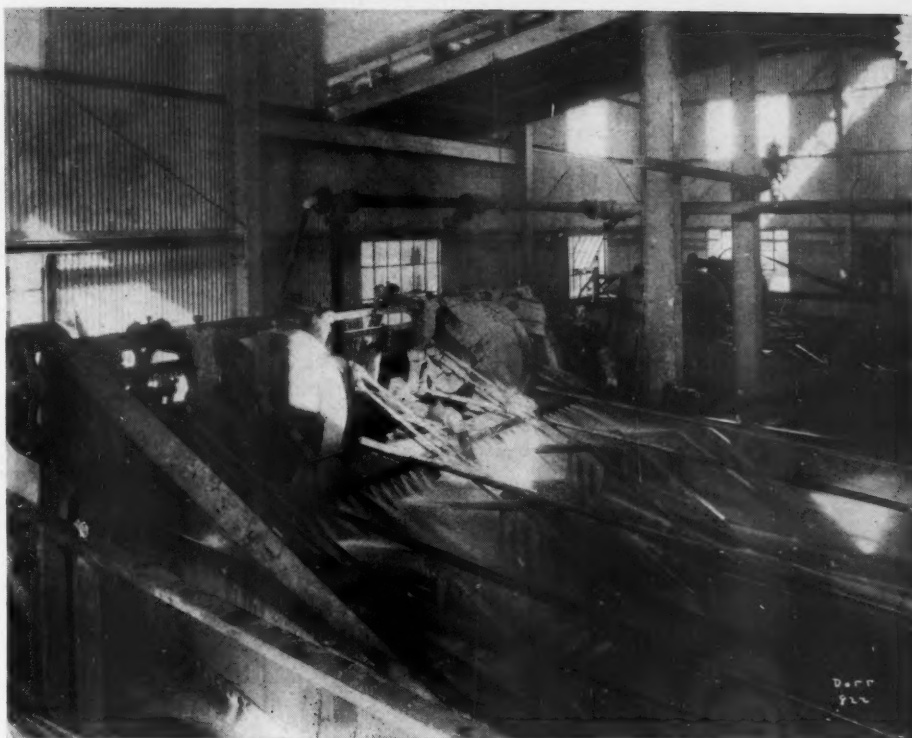
by the Dorr Co., which was developed for washing iron ore. As the clay of the iron fields is hard to remove and as the washing has to be very thorough, the makers thought the machine should find application in the sand and gravel and crushed stone industries and this has proven to be the case.

The machine consists of a washing screen, or barrel, set transversely to a Dorr classifier which is below the tank in which the washing screen is placed. The feed which is usually screened through a 6-in. grizzly, goes into the barrel through a hollow trunnion. The tank is full of water and water is sprayed in above the sloping deck of the machine and flows out over baffles at the other end, carrying the clay and silt.

The washing barrel has (usually) 5/16-in. perforations, so that all that passes through is sand. The revolutions of the barrel set up a pumping action that keeps the holes from blinding. The heavy stuff which may be anything from 6-in. down to 5/16-in. diameter after being thoroughly washed is discharged and drained by an internal scoop which sends it to a rinsing compartment for removing the last traces of clay. The sand, which passes the 5/16-in. perforations is gathered by the rakes in the compartment below, washed, rinsed and dewatered. The products then are clean washed gravel and sand. The gravel may be separated into sizes by any kind of screens running dry or wet.

An installation of this machine made in a gravel plant at Metropolis, Ind. by the Western Indiana Sand and Gravel Co. has been very successful in producing clean material from the very dirty material pumped by a dredge. It is so successful, in fact that the owners thought they could safely add more dirt and clay and discontinued stripping. This saved them considerable money and did not lessen the quality of the product in the least.

At the plant of the Quinn Stone and Ore Co., Fort William, Ont., another of these machines solved a very vexatious problem in washing trap rock that came from a ledge filled with fine clay seams. An exceptionally clean product was obtained as noted in the review of the crushed stone



A washer for sand and gravel shown in action

industry found elsewhere in this issue.

There are three forms of clay which afflict the producer of sand, gravel and washed stone, clay balls, hard films of clay and free clay. Claims made for the Dorr washer are to the effect that it gets rid of all of them, the scrubbing and cascading action in the barrel breaking the clay balls and scrubbing off the clay films and turning them both into free clay which is easily removed by the overflow and the rinse that follows.

The Telsmith-Ajax washer looks like an ordinary jocketed cylindrical screen on the outside, but there are some important differences. The first is that it is provided with interior rings which hold back the larger stones and utilize these to crush the clay balls and to scour the films from the pebbles and grains.

The washer has a two-section jacket, which is considered an important feature. The scrubbing section is surrounded by a sand jacket which may have 3/16-in. or 1/4-in. holes. This is followed by another surrounding the first stone screen. It is perforated with 1/2-in., 3/4-in. or 1-in. holes. The advantage is that only a small volume of rock is carried on the smaller perforations and more accurate sizing results. The washer is shown on the first page of this section.

Hoists and Hoisting Equipment

DURING 1927, published descriptions of the following occurred in the new machinery pages: American Engineering Co.'s electric hoist, April 16; S. Flory Manufacturing Co.'s light duty hoist, October 15.

The Chisholm-Moore Co. has brought out a new model of its Cyclone hoist.

A Book on Belt Conveyors and Elevators

THE book on "Belt Conveyors and Elevators," by Frederic V. Hetzel, published in 1923 is now out in a second edition. The author notes in his preface to the new edition that improved types of idlers with roll and ball bearings have come very much into use since the first edition was published. He believes the future of belt conveyors depends largely on the use that is made of these low-friction idlers and discusses them in this second edition.

In the three years that have elapsed since the first edition appeared this book has proved its worth to anyone interested in the subjects of which it treats. The author from his long acquaintance with the design and manufacture of conveying and elevating machinery knows the development and application of such machinery through many stages. The tables and formulas are those which have been many times used in actual work and their reliability is proven. The book is published by John Wiley and Sons, Inc., New York.

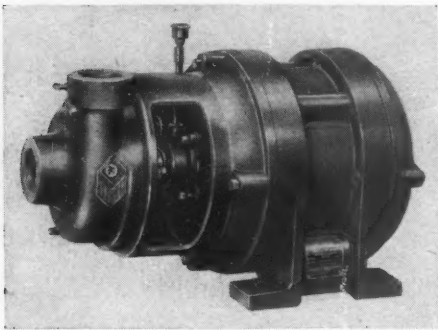


New type of sand washer in a large sand and gravel plant

Pumps and Dredge Equipment

THE Allis-Chalmers Manufacturing Co. has introduced a new combined motor and pump unit of simple compact, substantial design, the complete units being not much larger than a motor alone.

Both pump and motor parts are built and guaranteed by the same manufacturer and are properly proportioned to work together as an efficient unit. The unit is close coupled by fastening the pump impeller to one end of the extended motor shaft and the pump



Very compact new pumping unit

casing is bolted to an integrally cast extension of one of the motor end housings. This makes the simplest construction and eliminates a base plate, coupling and pump bearings and does away with the possibility of misalignment between the pump and motor. The motor bearings, which are the pump bearings as well, are over size Timken tapered roller bearings, and are mounted in dust and grease tight housings. These bearings carry the thrust of the pump impeller and need only infrequent renewal of the lubricant.

The pumps are built in $1\frac{1}{4} \times 1\frac{1}{4}$ in., $1\frac{1}{2} \times 1\frac{1}{2}$ in., 2×2 in. and $2\frac{1}{2} \times 2\frac{1}{2}$ in. sizes and can be used with 1, $1\frac{1}{2}$, 2, 3, 5 and $7\frac{1}{2}$ hp. motors. The capacities range from 25 to 200 g.p.m. against heads of 50 to 100 ft.

The Climax Engineering Co. has perfected a new pumping unit especially adapted for the smaller sand and gravel operations, using a direct connected Hetherington and Berner pump. It consists of a 85-hp. engine especially adapted for sand pump drive, radiator cooled, complete with vacuum feed, service pump drive and electric starter and generator. The unit is furnished on a structural steel base and the power is transmitted through a twin disc heavy duty enclosed clutch to a special Allis-Chalmers "Texrope" drive. This furnishes the necessary speed reduction between the engine and a Hetherington and Berner 6-in. sand pump. The sand pump is a heavy duty pump made of semi-steel and capable of passing 4-in. rocks. The entire unit operated together has a capacity of 1000 gallons per minute.

A new and exceedingly simple pipe connection for pipes used in dredging and similar work has been brought out by the Fons Flexible Pipe Coupling Co. It consists of two round section gasket rings that are slipped over the end of the pipe and clamped firmly to it by a steel casing. The casing is put on in two sections which are fastened by driving in two wedge shaped keys, so that the device is not only placed quickly but it has the advantage of needing no other tool but a hammer to put on or take off. It will work on an old pipe as well as on a new one.

For ordinary dredge service this form of

coupling will provide sufficient flexibility for the swinging of the boat, as it can be bent through a considerable angle. It is recommended by the manufacturers for permanent as well as temporary lines.

The Bucyrus Co. built a hydraulic dredge which, while it was not employed in the rock products industry, is of interest as showing the capabilities of oil-engine drive in such work. It has four 1150-hp. oil engines driving generators to produce current for the various motors on the hull, and it is the first of its kind afloat.

Articles published during the year on pumps include: American Well Works centrifugal pump (Mar. 5); Hetherington and Brenner's dredging pump (Mar. 19), and steel spuds (May 28); Ingersoll-Rand compressor-pump outfit (Mar. 19); Pennsylvania Pump Co.'s pressure boiler feed pump (Feb. 19).

Batchers and Steel Bins

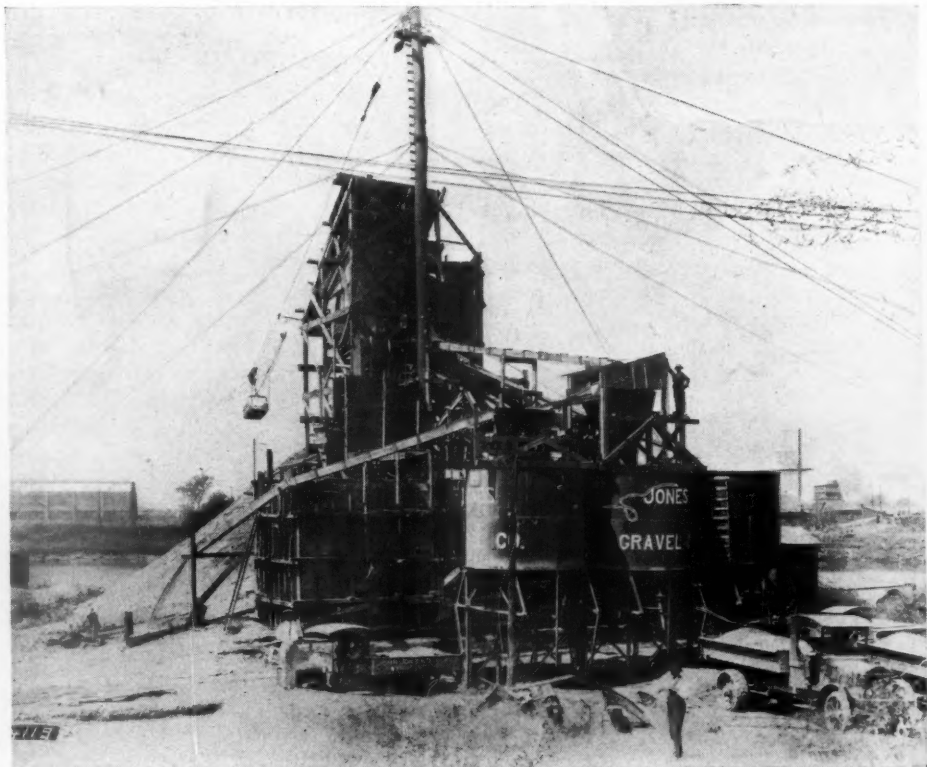
BATCH delivery of aggregates and cement increased a great deal in 1927. A number of companies that had withstood the demand to furnish materials in batched proportions found it advantageous to install the system in order to satisfy their trade. The Blaw-Knox Co. furnished a long list of rock products plants which had installed the bins and batchers made by this company, a proof that this method of delivery is growing in popularity.

Batchers are made by this company to deliver measured volumes or predetermined

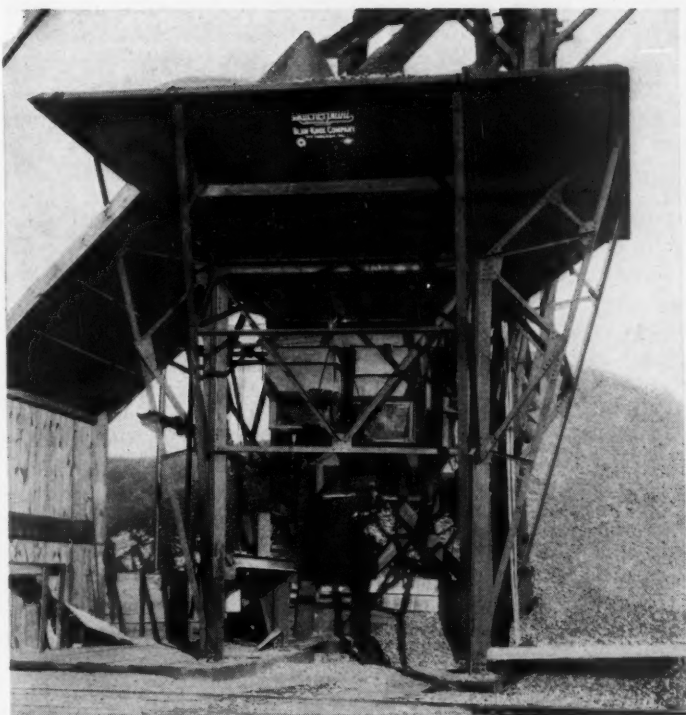
weights. The weighing batcher is a favorite in many truck plants because it enables weighing and loading to be done at the same time. This saves the time of driving to the scales and having the load weighed and recorded.

The Blaw-Knox company notes that the bins it makes are now arranged for interchangeable gates. A new under-out radial gate will be supplied with these bins where it is specified that they are wanted for coal storage.

The central concrete mixing plants made



Steel truck loading bins at a sand and gravel plant



A batcher plant equipped with both weighing and volume proportioning

by this company were put out in larger units than ever before. In many instances they were arranged to use bulk cement and to combine the cement by weight instead of volume.

An improved shaker gate and an improved counterweight system is furnished with the "Inundator."

A rapid adjustment device has been placed on the Blaw-Knox standard volume batches, to enable rapid changes of proportioning the material.

The Blaw-Knox weighing batcher is now arranged for both volume and weight batching. During 1928 the company will put on the market a complete range of measuring equipment for use with 2-yd. mixers in connection with central mixing and proportioning plants.

The George Haiss Manufacturing Co. has brought out a double batcher for saving time in loading trucks that carry double batches.

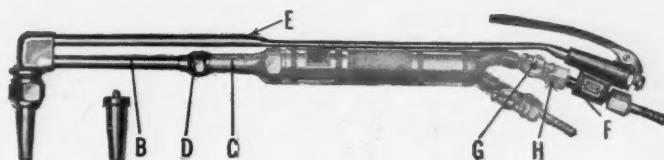
"The double loader does not take the place of two loaders, one in stone and one in sand. It makes two batches of stone, or two batches of sand, available at one time for the double batch truck. The loaders are standard Haiss loaders, excepting that the creeper mounting is 15 in. longer and the front chassis construction is heavier, to carry the double load, and the hopper has a dividing plate and two outlet gates to discharge the two batches independently. A truck gets two batches of stone, then the cement, and then two batches of sand. The value of the double batch loader over the single is in faster dispatching of the trucks, saving 20 to 30 seconds at the stone and 15 to 20 seconds at the sand, as

the truck does not have to wait with one batch on while the second batch is being placed in the hopper.

"The hoppers are of the Haiss 'Precision' type, with micrometer capacity adjustment and can be provided with strike-off and interlock. The maximum capacity, struck-off, is 2 cu.

New York City, has recently added to its line the CW-101 cutting attachment for its W-101 welding blowpipe. It is intended to handle occasional rather than cutting work, especially when the amount and nature of the work done does not warrant the purchase of a separate cutting outfit. Fitted with two nozzles, this attachment is said to be capable of handling steel and wrought iron up to 1 or 1½ in. thickness.

To connect the attachment to the W-101 welding blowpipe, the stem and nut assembly is first removed from the blowpipe. The short tube (b) of the attachment is then inserted into the mixer tube (C). The stem nut (d) is not tightened until later. The



Cutting attachment for welding blowpipe

ft. batches, and is adjustable to two 18 cu. ft. batches.

By a single substitution in the upper truncated pyramid section and the bolting in place in the lower box section of some reducing plates, the capacity is changed for sand to two batches of 11 to 16 cu. ft. each."

Cutting Attachment for Welding Blowpipe

FOR users of oxy-acetylene welding equipment who wish to do a limited amount of metal cutting, the Oxweld Acetylene Co.,

long tube (E) is next held along the right hand side of the handle, and the union nipple (F) is sprung into the rear of the oxygen valve body (G). The long tube is swung to the top of the handle, and the connection nut (H) is screwed on and tightened.

In disconnecting the attachment, the stem nut (D) and the connection nut (H) are first unscrewed. Then the long tube (E) of the attachment is swung to the right hand side of the handle and the union nipple (F) is sprung out of the rear of the oxygen valve body (G). The attachment is slid forward and the stem removed from the mixer tube. The method of connecting attachment may be seen from the cut.



A double batcher for loading two separate batches on a truck

Cement Mill Equipment

THE year's improvements and developments in crushing and grinding machinery used in cement manufacture may be found in the section of this review devoted to crushers and pulverizers. Articles published during the year on other cement mill equipment include: Botfield Refractories "Adamant" gun (May 28); Dorr vacuum filter (Oct. 29); Huron seal ring for cement

be found in the article on this plant published in the October 29 issue of *Rock Products*.

The name "Solo" has been given to this kiln because it does in one operation what usually requires two. The cooler is attached to the burning drum which allows both kiln and cooler to be placed on the same level, requiring no high foundation, stairs and like construction. The brick kiln heads are also dispensed with.

Another novel feature of this kiln is the enlarged burning zone which is 11 ft. 10 in. in diameter, while the preheating zone is 8 ft. 10 in. in diameter and the cooling section 9 ft. 10 in. in diameter. Although kilns of this form are new to American practice, they have been successfully used in several European plants.

The American Miag Corp. is introducing its kilns which are much used in European plants. They are

of the regular pattern with a separate cooler.

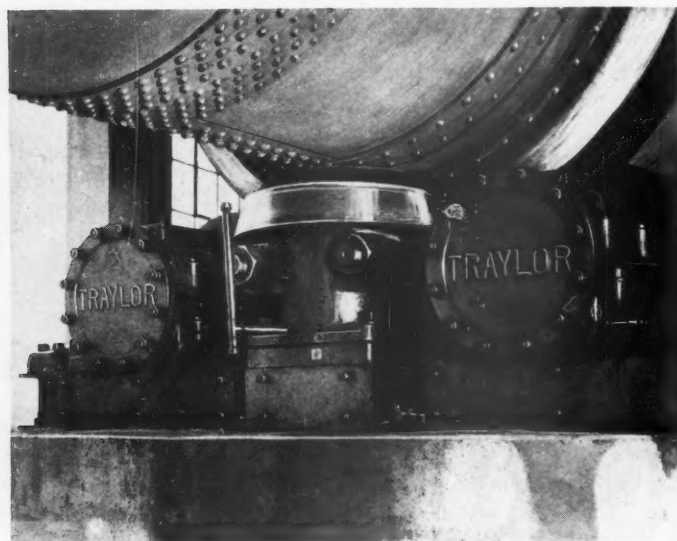
A kiln accessory which was described recently is the Huron gravity seal ring for kilns made by the Huron Industries, Inc.,

which also makes the Huron speed reducer. The company reports that the seal rings are in use by the Union Carbide Co., Niagara Falls, N. Y., Huron Portland Cement Co., Alpena, Mich., Crescent Portland Cement Co., Wampum, Penn., and Wyandotte Portland Cement Co. Wyandotte, Mich.

The Manitowoc Engineering Works introduced a new slurry agitator in 1927. It consists of a structural frame work suitable for any size of tank with two pipe arms revolving close to the bottom of the slurry tank. These arms have lifting teeth and air outlets. Air is admitted intermittently by a governor valve which gives the full air pressure for a predetermined period. The air-feed pipe is 1½-in. in diameter, but it has a section of small pipe to limit the amount of air consumed, while, at the same time, it allows the full pressure of the compressor to build up, avoiding plugging of the outlets. Power and air consumption are said by the makers to be very small.

The Hill Clutch Machine and Foundry Co. is bringing out a new slurry agitator which it calls the Venturi tube agitator. It has only recently been tried out in cement mills and the company states that it is not ready to say more than that it has been shown to agitate slurry very completely. It is expected that longer service will prove that the agitator will eliminate deposits of material in the tank which is one of the things it has been designed to prevent.

The Wilfley Slurry pump made by A. R. Wilfley and Sons was installed in the greater number of the cement mills built in 1927. One especially interesting installation is at the Valley Forge mill, where a 3-in. pump is used to deliver 100 bbl. per hour of slurry at 36% moisture through 550 ft.



Single roll support and thrust bearing of one of the very long kilns

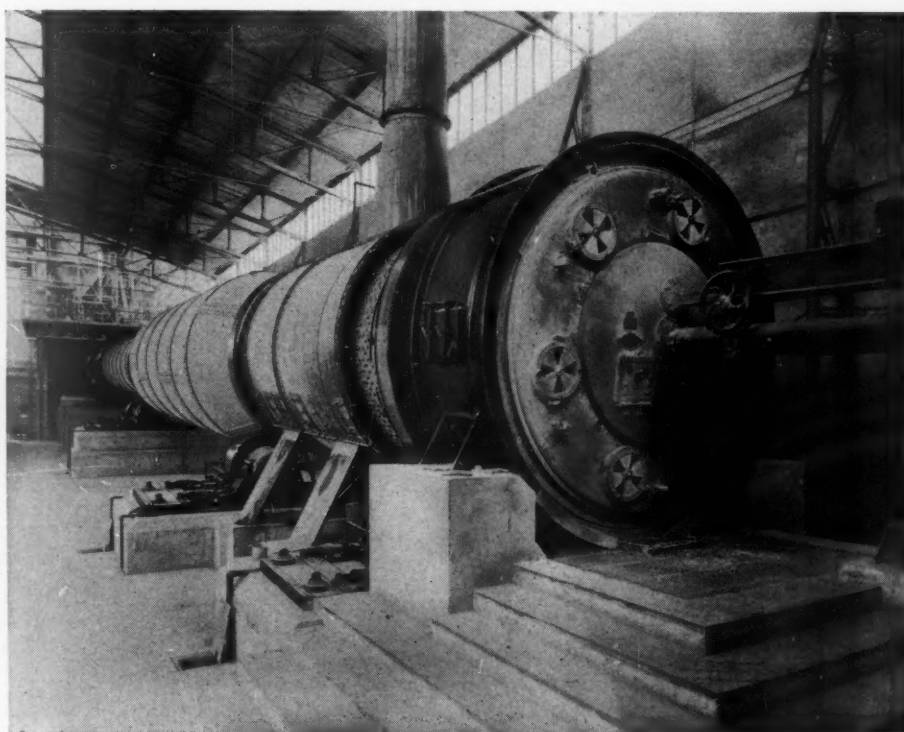
kilns (Sept. 17); Reeves electric remote control (May 28); Western Cartridge Co.'s cement kiln gun (Apr. 30).

The year 1927 is notable for the large emits introduced in cement mill practice kilns of greater length and larger diameter (in the burning zone) have been installed in several of the newer plants.

The Traylor Engineering and Manufacturing Co. made several of the largest and longest kilns installed this year. Among them may be mentioned: Two for the Phoenix Portland Cement Corp., Birmingham, Ala., 11 ft. 3 in. to 10 ft. dia., 343 ft. 9 in. long; one for the Trinity Portland Cement Co., Houston, Texas, 11 ft. 3 in. dia., 300 ft. long; one for the Missouri Portland Cement Co. for its plant now being built at Prospect Hill, Mo.; 10 ft. dia., 311 ft. long; one for the Monolith Portland Cement Co., Monolith, Calif., for its new Wyoming plant, 11 ft. 3 in. to 10 ft. dia., 341 ft. long. In these there is almost a third of a mile of rotary kilns and their combined capacity is over 10,000 bbl. per day.

All these kilns have the distinctive feature of Traylor rotary kilns, the single roller support, which was introduced in 1926.

The Polysius Corp. introduced the "Solo" kiln to American cement practice and the first one was installed in the plant of the Valley Forge Cement Co., West Conshohocken, Penn. A detailed description may



A cooling section and enlarged burning section distinguish this type of kiln

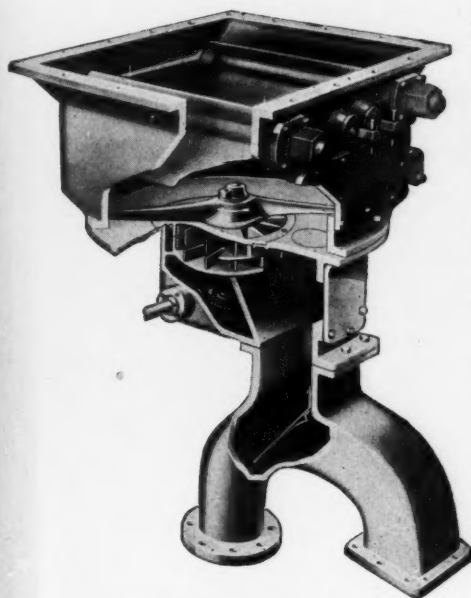
of pipe and with a static lift of 82 ft. 6 in. The pressure developed is 90 lbs. Some engineers claimed that such an installation would not work, but it has worked very successfully and preparations have been made for installing another unit of the same kind.

The Polysius Corp. has introduced a new slurry pump operating on the montejuos principle, the pressure of the air from the compressor forcing the slurry out. Two pumps working alternately give continuous action.

The Fuller Lehigh Co., Fullerton, Penn., has introduced a new design of pulverized coal feeder known as the Bailey feeder. This device consists essentially of four parts, the shut-off gate, distributor, fluffer wheel and a feeder wheel. The coal enters the feeder through two gates of the shutter type, pivoted near the sides in order to give the maximum free opening for passing of the coal, the distributor having two arms rotating at the bottom of the gate housing undercutting the full area and keeps the entire volume of coal in a fluid condition. Immediately below the distributor is a fluffer apron which is a fixed plate with an open sector on one side only. The coal drops through this opening into the rotary fluffer wheel. Immediately below the fluffer wheel is a feeder apron, a fixed plate with an open sector on the side opposite the opening in the fluffer apron. The coal after dropping into the pocket of the fluffer wheel is carried around under the solid portion of the fluffer apron to the feeder wheel below. The feeder wheel rotates and carries the coal around the feeder apron to the open port in the spaces through which it drops into the discharge pipe.

Other new developments by the Fuller-Lehigh Co. include a new series of mixing tees for use in burning pulverized coal in rotary kilns or dryers. The design features an adjustable nozzle with a cast iron body.

Waste heat water tube boilers made by



Construction of new pulverized coal feeder

the Edge Moor Iron Works were installed in three cement plants which were built in 1927 and in some older plants and plants being built. The installation at the new plant of the Florida Portland Cement Co. was described in detail in ROCK PRODUCTS for November 26.

Another new installation was at the plant of the Dewey Portland Cement Co., Davenport, Iowa. Originally two Edge Moor boilers with the usual accessory machinery were installed but after the plant which was started last June had been running 60 days it was decided to increase capacity, and in November another boiler was ordered. This will be of 917 hp. and will use the heat from a third 11x175-ft. kiln. The accessory apparatus will be the same as for the two boilers originally installed.

The new plant of the Ideal Cement Co., Fort Collins, Colo., has two kilns and is operating two Edge Moor boilers which are somewhat larger than those of the Florida installation (11,390 sq. ft., as against 9170 sq. ft.). These boilers are built for 225 lb. working pressure and they are equipped with the same superheaters, economizers and fans as the other installations mentioned.

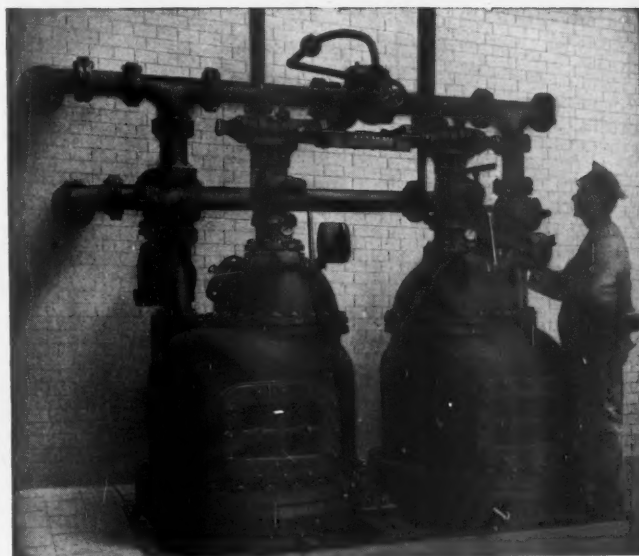
The Sandusky Cement Co. is installing three Edge Moor boilers in its plants. A 924 hp. boiler is going into its plant at Dixon, Ill., where it already has one boiler of this size in service. At its York, Penn., plant, manufacturing white cement, it is installing a 824 hp. boiler and at the plant which it is building at York, Penn., to manufacture gray cement, it will install a 992 hp. boiler.

The North American Cement Corp., which is building a three-kiln plant at Security, Md., is installing three 1000-hp. Edge Moor boilers which will work at 225 lbs. pressure.

The Marquette Cement Co., which already has seven Edge Moor boilers in operation, will install another at its La Salle, Ill., plant. This is of 989 hp. and will work at 200 lb. pressure.

It is reported that several other plants, new and old, are considering the installation of waste heat boilers for the coming year.

Dryers are now usual equipment in many rock products plants, and with the particular demands made on them by these industries, manufacturers of this equipment have designed them to meet the conditions of use. The Randolph vertical dryer, manufactured by the Fuller-Lehigh Co., Fullerton, Penn., is designed to dry coal, deriving its heat either from



Pumps which operate by direct air pressure, working alternately

a separately fired furnace or from the cooling of cement clinker. This machine, illustrated herewith, is divided into three compartments by means of vertical partitions, as follows: Incoming gas compartment, coal compartment, outgoing gas



Fans for waste-heat boilers

compartment. Coal passes through the center compartment of the dryer and feeds down by means of gravity, the rate of flow depending on the amount taken out of the bottom of the dryer. The dryer is usually installed above the pulverizing mills and in this way the feeder to the grinding mills serves as a control

for flow of coal through the drier.

The coal drying compartment is arranged with a series of gas ducts or tunnels, these tunnels being in alternate horizontal rows, arranged so as to divide the flow of the material. The hot gases used enter the end of the tunnels of one row, escape from the open bottoms, and flow through the descending streams of material into the exhaust tunnels of the next higher row, and out of the end of the tunnels to the gas out-chamber. The gases are handled by means of an exhauster type fan connected to the outlet chamber of the dryer.

Several of the new cement mills built in 1927 have installed this device. These include the Southwestern Portland Cement Co., Osborn, Ohio; Great Lakes Portland Cement Co., Buffalo, N. Y.; Phoenix Portland Cement Co., Birmingham, Ala.; Louisiana Portland Cement Co., New Orleans, La.

The new "Unax" clinker cooler, manufactured by F. L. Smidth Co., New York, the first installation of which was in the Phoenix Portland Cement Corp.'s plant at Birmingham, Ala. (June 25).

Refractory Materials

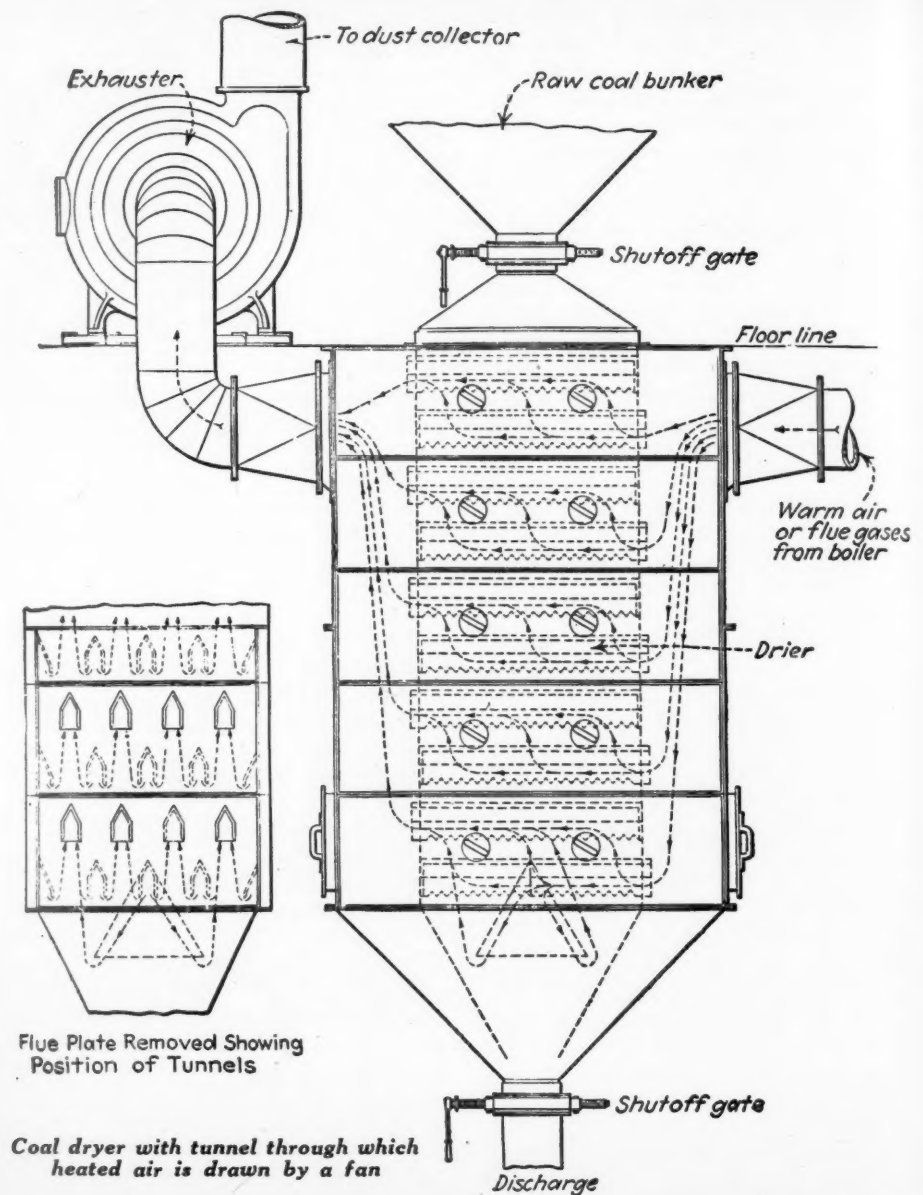
THE performance records of cement kiln linings with the high alumina fire-brick "Arcofrax," manufactured by the



End view of pile at right

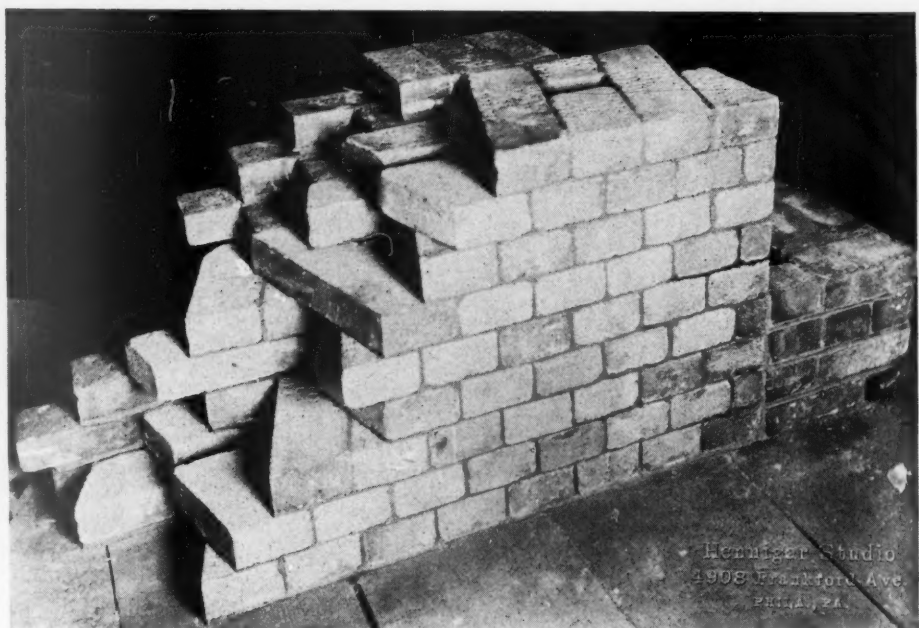
General Refractories Co., Philadelphia, Penn., were published in *Rock Products*, May 14. Other data pertaining to the manufacture and efficiency of "Kruzite," the high alumina refractory manufactured by the A. P. Green Firebrick Co., Mexico, Mo., were given in *Rock Products*, September 17.

A new product, "Biasbrix," an unique shaped refractory, has just been introduced by the General Refractories Co. As the name implies, Biasbrix are laid upon the bias, one brick overlapping and tying together three other Biasbrix in a self-locking construction which is said to give tight joints and a strong wall.



Flue Plate Removed Showing Position of Tunnels

Coal dryer with tunnel through which heated air is drawn by a fan



Pile of high alumina refractories made in special shapes

Henniger Studio
1908 Frankford Ave.
PHILA., PA.

Speed Reducers

THE new plant of the Great Lakes Portland Cement Corp., the electrical features of which, more particularly, were described in *ROCK PRODUCTS*, September 3, is notable for mechanical features as well. For example, the gear units used throughout are built with Sykes continuous tooth herringbone gears, with Timken roller bearings, made by the Farrel-Birmingham Co. With the exception of one unit, all are single reductions.

By intelligent planning it was found possible to make the gear units of only two different sizes. The ratios were kept the same throughout and the difference in ultimate speed of the driven mechanism effected by using different chain sprockets which are fitted to the low speed shafts. In this way the gear units are all interchangeable and their initial cost low.

One of the most important features of these gear units is the mounting of the gears. It has often been considered impracticable with herringbone gears to hold both the pinion and the gear from end movement, but experience has shown that it is not only practical but beneficial, since the gears are protected from abuse and end thrusts set up by connected mechanism. The makers of the gears state that each gear is cut after being mounted on its shaft, ensuring concentricity of the teeth with the journals and the apices of the teeth being central in the face.

Another unique feature of the machinery is the Sykes flexible couplings which are fitted throughout, the largest transmitting 800 hp. at 187 r.p.m. and the smallest 4 hp. at 900 r.p.m. This coupling has no non-metallic parts and has far more flexibility than the flexible couplings generally used.

A number of views of this plant are shown on this and the succeeding pages.

The Palmer-Bee Co. has just recently developed a line of herringbone speed reducers which embody a number of unusual features.

The gears are of the Sykes continuous tooth herringbone type.

Unlike most other herringbone reducers, the high and low speed shafts are in line, allowing the power to be delivered in a straight line from the point of its inception. This construction is made possible by the high speed shaft being bored out to receive the turned down end of the low speed shaft, both of which are supported in an extra long bearing.

Small size gears are cut from steel forgings and the larger ones from annealed electric steel castings. Pinions are cut from forgings of high carbon steel. Bearings are large and are fitted with replaceable phosphor bronze bushings. All shafts are cut from high grade Acme steel, turned and ground to size.

The casing is constructed of cast iron,

strongly ribbed and braced, and is split on the center line of the shafts so that the cover can be removed. Bearing caps are replaceable so that the removal of the cover does not disturb the bearings. Lubrication is by means of a patented oil bath, splash and gravity feed system, which assures a plentiful supply of oil to the gears, shafts and bearings, dispensing with the need of external grease or oil cups.

In the new line of improved "Palmerbee" speed reducers the consumer is given the choice of either standard involute spur gears or Sykes continuous tooth herringbone gears.

The Cleveland Worm and Gear Co. made some interesting installations at the new Fort Collins, Colo., plant of the Colorado Portland Cement Co. Some views of these installations are illustrated herewith.

Another notable installation of speed re-

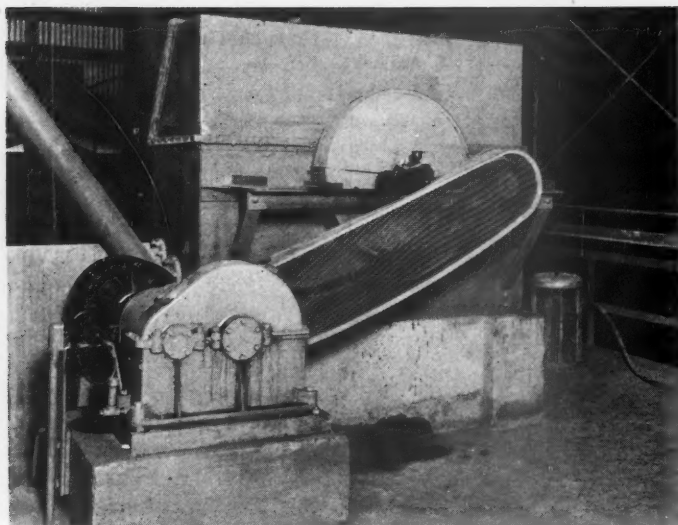
ducers in the cement industry in 1927, in the modernizing of an old mill, was made by the De Laval Steam Turbine Co. at the Nazareth Cement Co. plant, Nazareth, Penn. Some typical examples of this installation are shown herewith. In the rebuilding of the plant direct drives and De Laval worm gear reducers were used throughout.

Among the new features in the speed reducers made in 1927 by the Falk Corporation are listed the following:

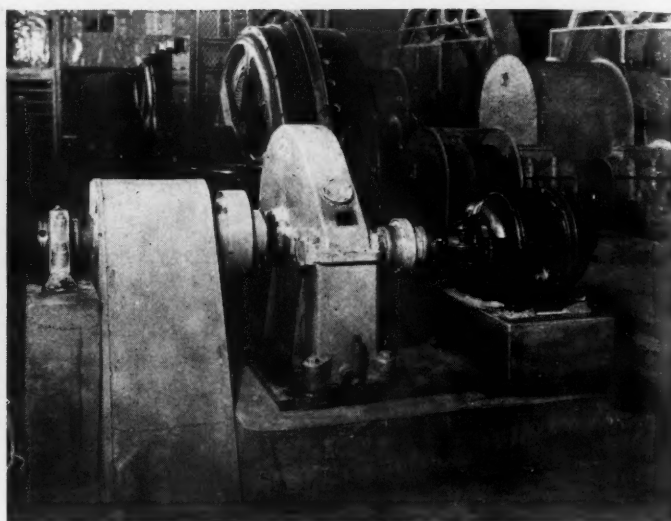
- (1) The use of Falk *continuous tooth* herringbone gears.
- (2) The elimination of ribs and pockets *inside* the gear case.
- (3) A new self-contained lubricating system which oil floods all working parts.
- (4) The use of either bronze or steel backed babbitt lined bearings of airplane type.
- (5) Standardization of gear ratios so that almost any combination may be had directly from stock for very quick shipment.
- (6) Standardization of motor beds.



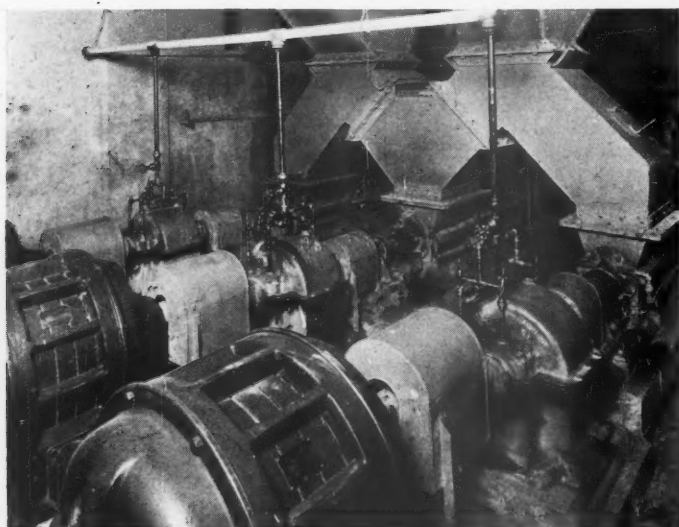
Finish grinding mill feeder, with 4-hp., 900 r.p.m., 13 3/4 to 1 reduction gear, Great Lakes Portland Cement Co.



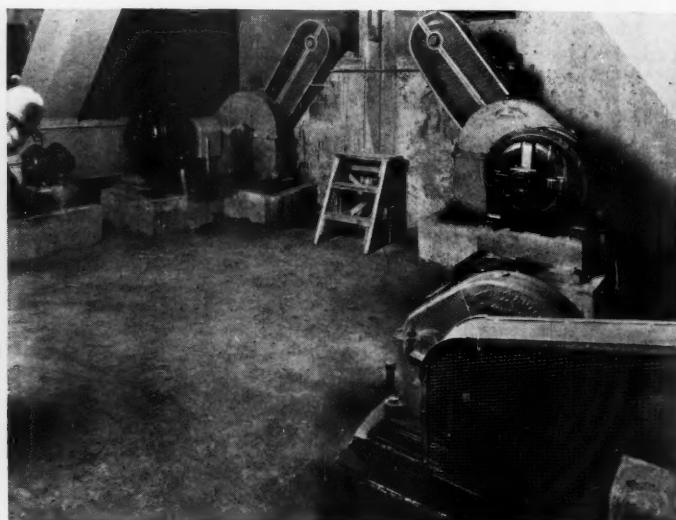
Slurry feeder with 4-hp., 900 r.p.m., $13\frac{3}{4}$ to 1 speed reducer—Great Lakes plant



Clinker carrier, 25-hp., 750 r.p.m., $13\frac{3}{4}$ to 1 ratio reducer—Great Lakes plant



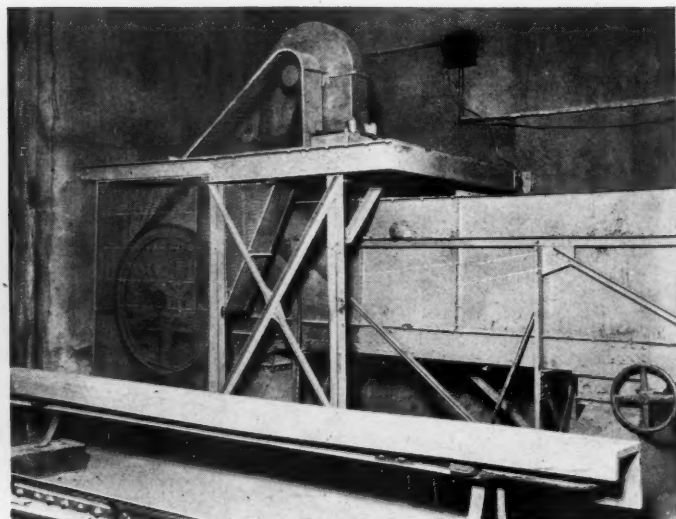
Cement pumps, 100-hp., 1500 r.p.m., 1.55 to 1 ratio reducers—Great Lakes plant



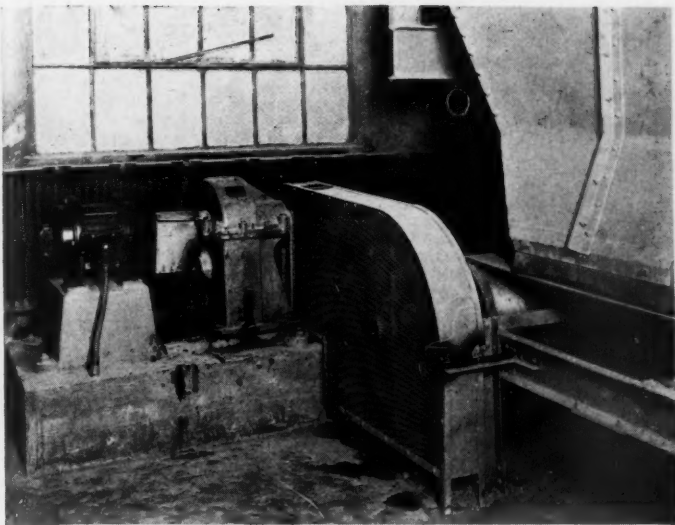
Silo discharging screw conveyors, 25-hp., 750 r.p.m., $13\frac{3}{4}$ to 1 reduction, Great Lakes plant; 7 $\frac{1}{2}$ -hp., 750 r.p.m., $13\frac{3}{4}$ to 1 reduction



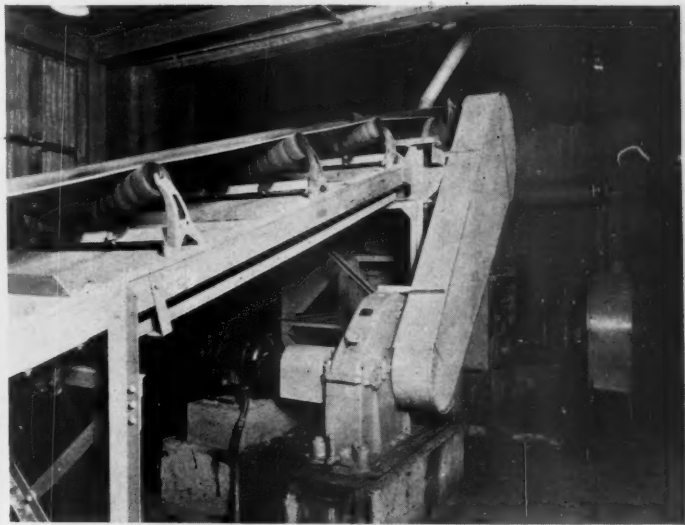
Dust collector screw conveyors, 5-hp., 750 r.p.m., $13\frac{3}{4}$ to 1 reduction—Great Lakes plant



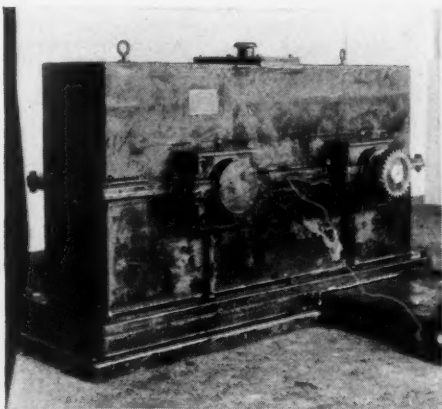
Rock carrier, 25-hp., 750 r.p.m., $13\frac{3}{4}$ to 1 reduction, Great Lakes plant



Bag sorting belt conveyor; 5-hp., 750 r.p.m., 60 to 1 reduction, Great Lakes plant



A 36-in. belt conveyor, 10-hp., 750 r.p.m., 13 3/4 to 1 ratio, Great Lakes plant



New chain-drive type of speed reducer

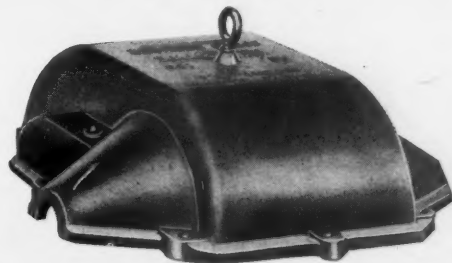
The Falk Corporation's flexible coupling has been redesigned to reduce the over-all dimensions, so it may be installed in a smaller space. A pressed steel cover has been substituted for the former cast-steel cover.

The Morse Chain Co., Ithaca, N. Y., has recently brought out a double reduction drive for reducing the ultimate speed of the final shaft operating machinery. The speed reducer shown in the photograph is used to transmit 50 hp. from an electric motor run-

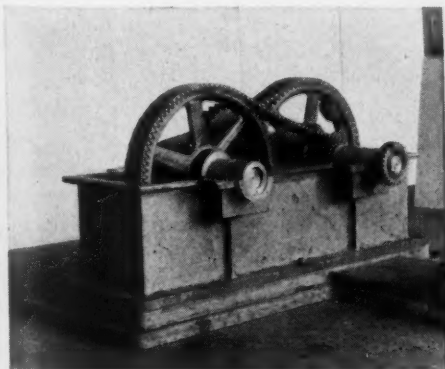
ning at 725 r.p.m. to an immediate shaft running at 178 r.p.m. and from the immediate shaft to drive a group of machines running 54 r.p.m., giving a speed reduction ratio of about 13.4:1.

Some of the advantages claimed for the new machine are rigidity, increased lubrication and freedom from dust. The operation is said to run with little noise or vibration and with the added assurance of silent chain drive, good efficiency, flexibility and positive speed ratios.

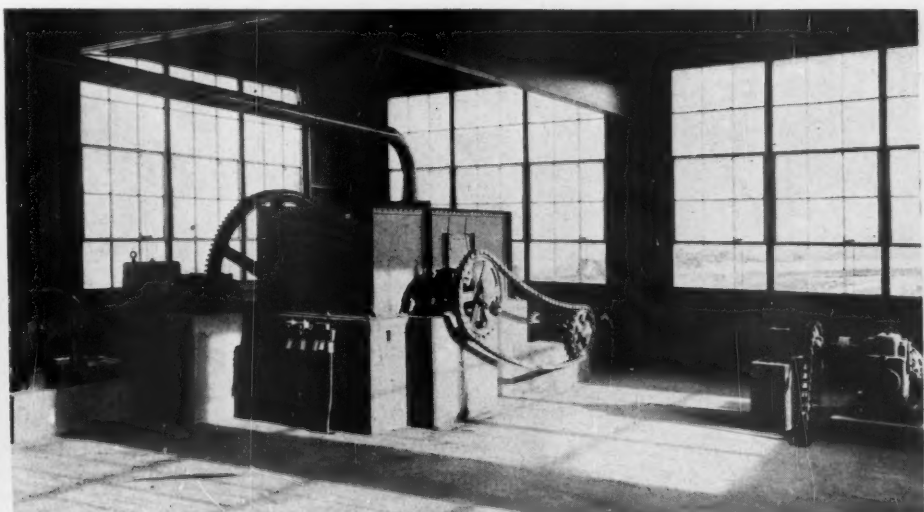
The installation may be made on sole plate carrying a reducer box and flexible coupling, the motor being connected through the coupling, or the sole plate may be eliminated, the motor then being mounted on a base attached to the casing. Babbitt or roller bearings are provided.



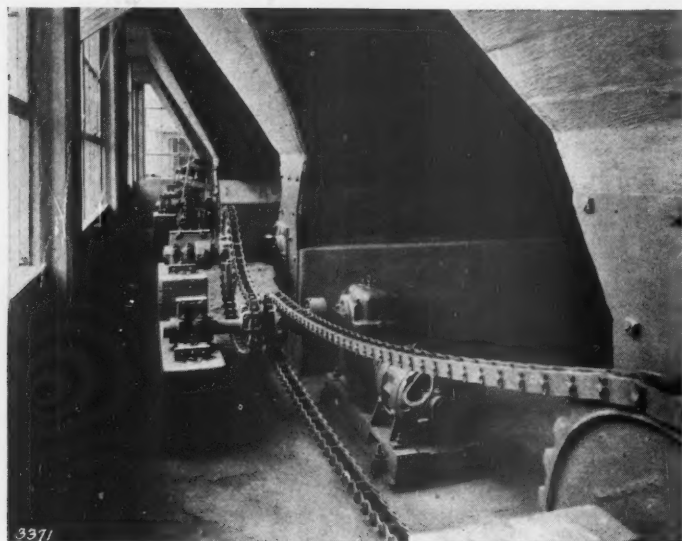
Reducer with straight line transmission



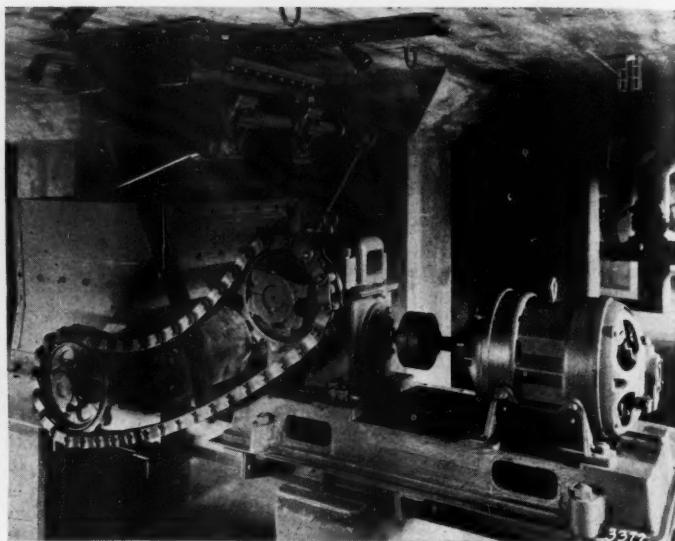
Chain-drive speed reducer with cover removed



Elevator (36-in.) and sampler drive, 30-hp., 870 r.p.m., 9 3/4 to 1 ratio; sampler elevator (14-in.), 7 1/2-hp., 870 r.p.m., 24 1/2 to 1 reduction, Ft. Collins plant



Cotrell electric precipitator dust collector screws; 5-hp., 870 r.p.m., 24 1/2 to 1 reduction, Ft. Collins plant



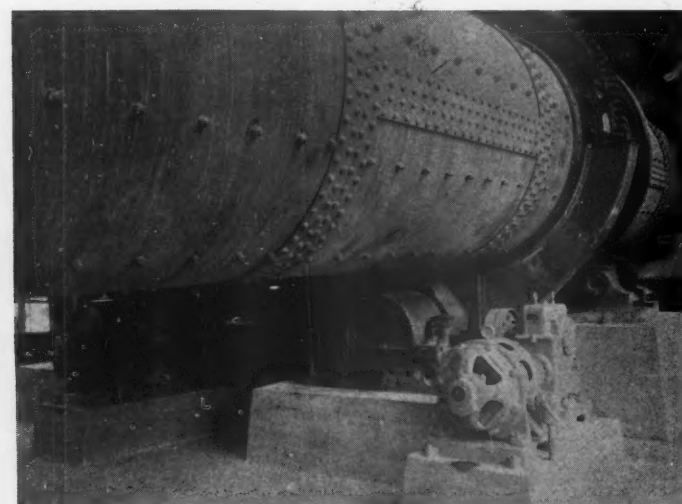
Rock storage bins, cradle feeders, 5-hp., 870 r.p.m., 24 to 1 reduction, Ft. Collins plant



Inclined screw conveyors under main collecting flues, waste-heat system, 7 1/2-hp., 870 r.p.m., 24 1/2 to 1 reduction, Ft. Collins plant



Elevator for rock (18-in.), 15-hp., 870 r.p.m., 13 2/3 to 1 reduction; screen feeder, 10-hp., 870 r.p.m., 13 2/3 to 1 reduction, Ft. Collins plant



Rotary dryers, 7 1/2 x 70 ft., 30-hp., 870 r.p.m., 9 3/4 to 1 reduction, Ft. Collins plant

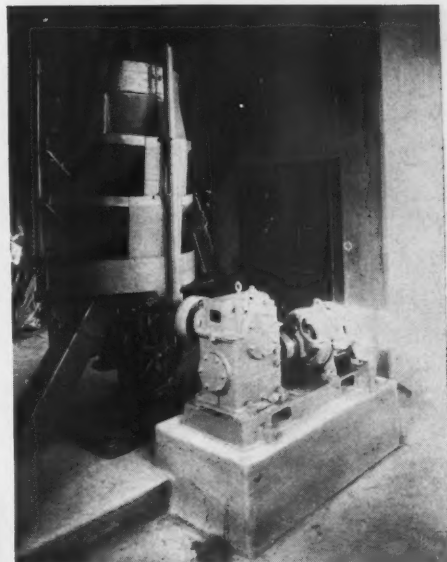


Drive on mixing screen and sampler, 7 1/2-hp., 870 r.p.m., 17 1/2 to 1 reduction, Ft. Collins plant

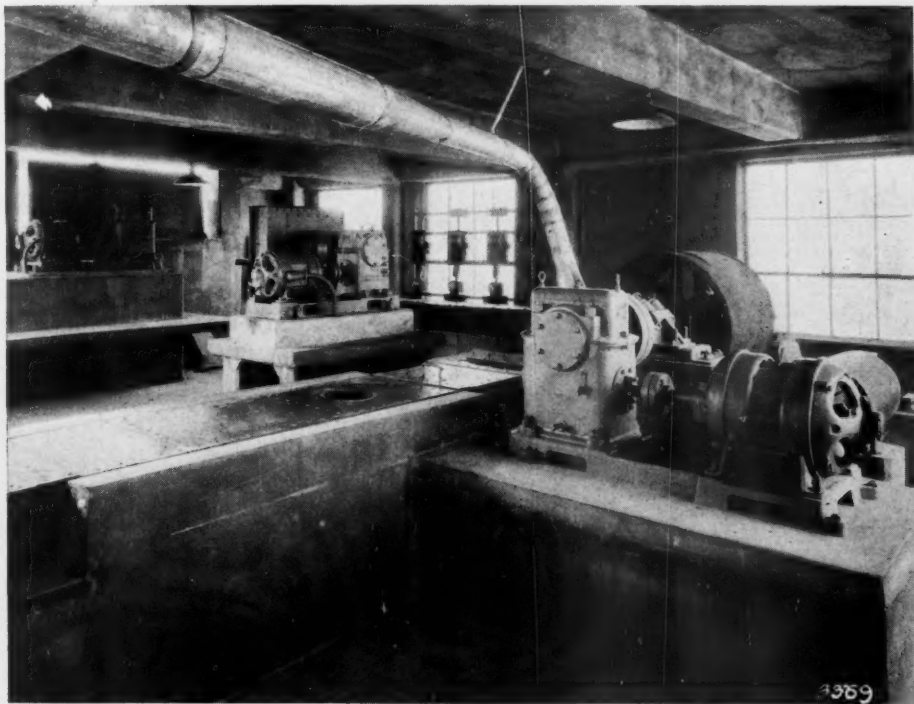
Some notable installations made in 1927 were at the plants of the Acme, Catskill, N. Y.; the Allentown, Catasauqua, Penn.; the Consolidated, Mildred, Kan.; the Crescent, Wampum, Penn.; the Dewey, Davenport, Iowa; the Great Western, Mildred, Kan.; the Huron, Alpena, Mich.; the Missouri, St. Louis, Mo.; the New Egyptian, Port Huron, Mich.; the North American, Howes Cave, N. Y.; the Peerless, Detroit, Mich.; the Phoenix, Birmingham, Ala.; the Southwestern, Osborn, Ohio; the Wabash, Osborn, Ohio, and the Wyandotte, Wyandotte, Mich. Many of these, of course, were merely additional units in established plants.

Of course this is not a complete resumé of speed reducers. They have now become

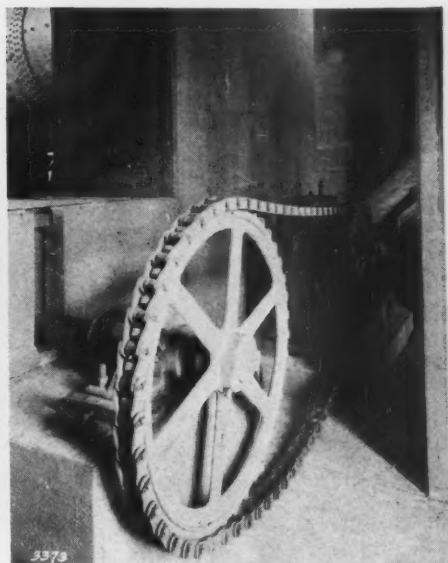
so much a part of the standard equipment of nearly all new plants in the rock products industry that there is little more to be said. We have merely tried to illustrate some of the more important installations that have been called to our attention. During the year we described several new makes of speed reducers, including one by the H. W. Caldwell and Son Co., which combined a chain drive with spur gears; the Falk reducer, referred to above, was described in detail in the March 19 issue; the spur gear made by the Huron Industries, Inc., which has been used at such plants as the National Gypsum Co., and the Huron and Wyandotte Portland Cement Co.'s; the new D. O. James worm gear reducer; the



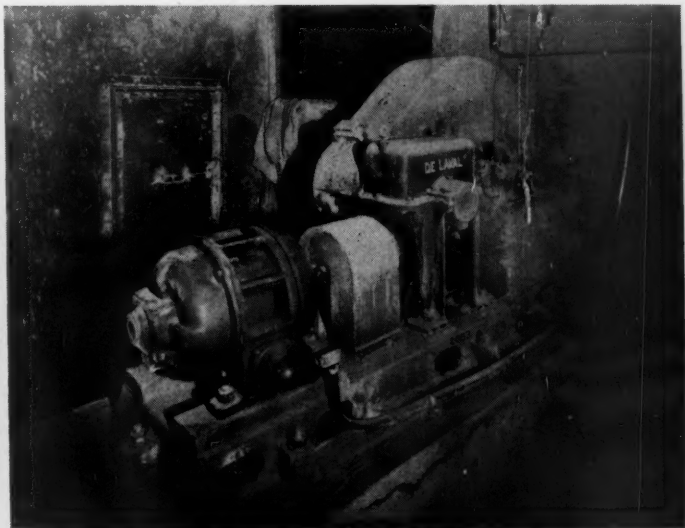
Bridgeman raw material sampler and drive, 5-hp., 870 r.p.m., 29 to 1 reduction, Ft. Collins plant



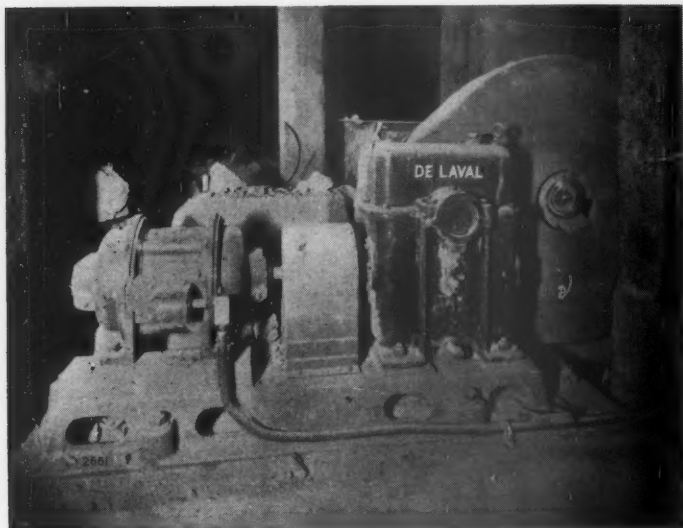
Compeb mill building, Colorado Portland Cement Co. plant, Ft. Collins, Colo. Left, 18-in. gypsum elevator, 10-hp., 870 r.p.m., 24 1/2 to 1 ratio; center, 6-in. gypsum elevator and screw conveyor, 7 1/2-hp., 870 r.p.m., 14 1/2 to 1 reduction; right, conveyor belt for clinker, 10-hp., 870 r.p.m., 24 1/2 to 1 reduction



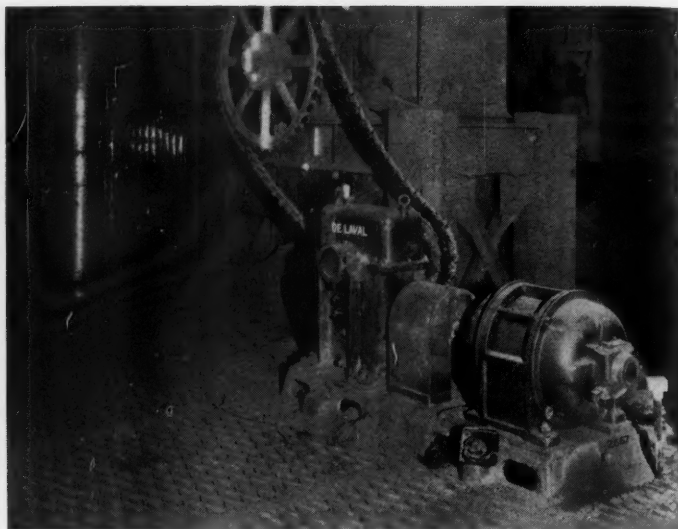
Drive on 14-in. drag conveyor, 15-hp., 870 r.p.m., 24 1/2 to 1 reduction—Ft. Collins plant



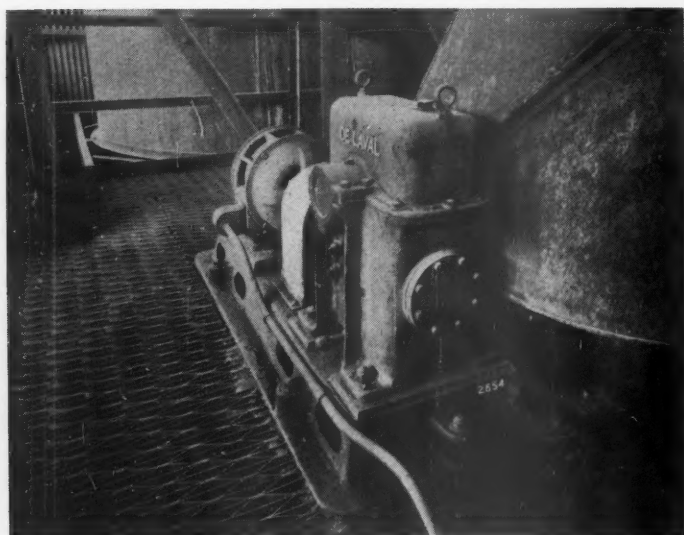
Screw conveyor, 5-hp., 900 r.p.m., 14 1/2 to 1, and elevator drives, 15-hp., 900 r.p.m., 9 3/4 to 1 reduction, Nazareth plant



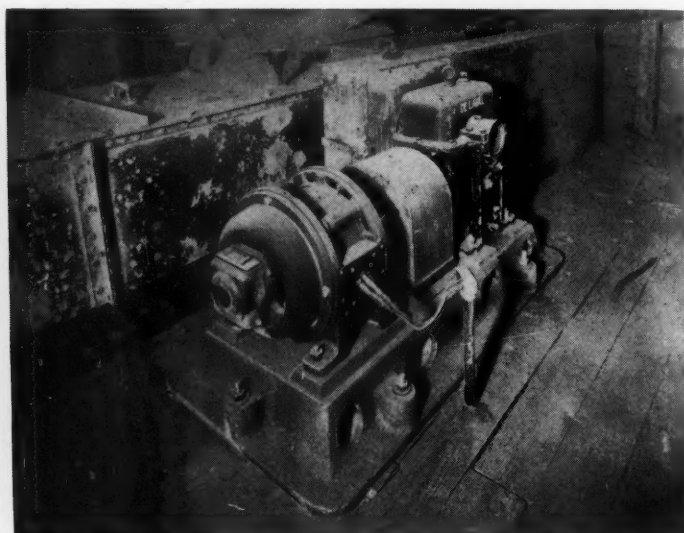
Drag conveyor drive, 5-hp., 900 r.p.m., 14 1/2 to 1 reduction, Nazareth plant



Elevator drive, 15-hp., 900 r.p.m., 9 3/4 to 1 reduction, Nazareth plant

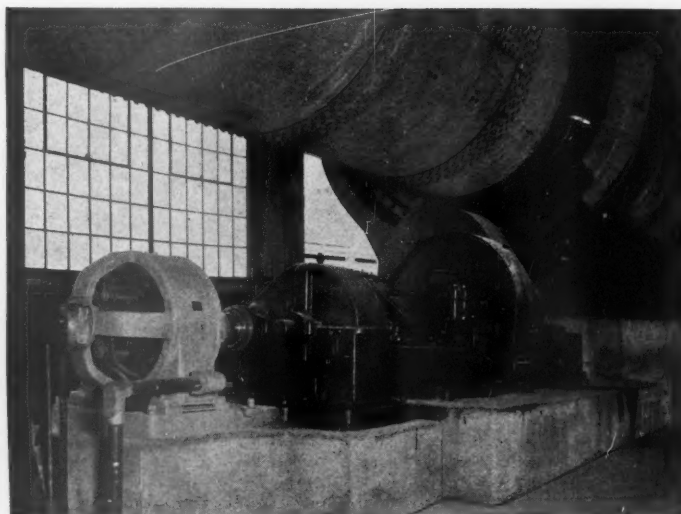


Elevator drive, 10-hp., 900 r.p.m., 9 3/4 to 1 reduction, Nazareth Cement Co. plant



Drag conveyor drive, 5-10-hp., 900 r.p.m., 15 1/2 to 1 reduction, Nazareth plant

Link-Belt Co.'s new Sykes herringbone gear reducer; the Nuttall helical gear speed reducer; the Stephens-Adamson Manufacturing Co.'s new gear reducer, and its new variable speed power transmission device. Manufacturers' literature on speed reducers is very complete, the most recent example to reach our desk is a new 56-p. catalog of the W. A. Jones Foundry and Machine Co., which contains much helpful engineering data. Other gear-reducer manufacturers who have made installations in the rock products industry in 1927 are the Horsburgh and Scott Co., the Philadelphia Gear Works, the Fawcus Machine Co., Wm. Ganschow Co. and



Herring-bone geared speed reducer driving one of the three largest kilns in the cement industry

the Hill Machine and Foundry Co.

It is interesting to note in closing that nearly all the notable new sand, gravel, crushed stone and slag plants built in 1927 make liberal use of speed reducers. Notable examples, the new Arrow Sand and Gravel Co. plant, Columbus, Ohio; the Monroe, Mich., plant of the France Stone Co., the South Chicago, Ill., plant of the France Slag Co., have been described in *Rock Products*. Geared speed reducers are particularly favored for driving rotary screens. Their use not only lends efficiency to such drives but a very desirable elimination of a dangerous accident hazard.

Prime Movers

AN article on the Benz Diesel engine, manufactured by the Chicago Pneumatic Tool Co., was published in the March 19 issue of ROCK PRODUCTS.

The Climax Engineering Co. has brought out new models, one, especially adapted for small dredging operations, being mentioned in the pump and pumping machinery section.

Another model is its TU 4-cylinder (5½-in. by 7-in.) portable power unit mounted on wheels, suitable for quarry drainage and like work.

Another is the 6-cylinder, 6-in. by 7-in., engine complete with equipment required by the Fire Underwriters Laboratory for fire standby purposes on 1000 g.p.m. pumps.

An important and somewhat revolutionary feature of these and other Climax motors is the automatic spark advance. The control of the spark is taken from the operator and automatically controlled so that it is in the proper position at the time of starting and advanced to the correct position, regardless of the load or the speed.

The Buda Co. brought out its Model J.H. early in the year. This is a 4-cylinder engine with a 6-in. bore and 7½-in. stroke. Some of its distinctive features are: Patented force feed lubricating system contained in a seamless tube cast integral with the crank case, oil pump submerged in oil, a heavy crankshaft provided with a pad for balancing, block separate from crank case for quick servicing, and specially designed head to produce the most power without deterioration.

The Wisconsin Motor Manufacturing Co. has a new development in its Model E engine a 6-cylinder, with 6-in. bore and 7-in. stroke, valve-in-the-head type, which will deliver 135-hp. at 1000-r.p.m. according to the makers' specifications.

This engine, which is manifolded to burn kerosene as well as gasoline, has been designed for such heavy machines as locomotives, tractors and shovels. It has a 3¾-in. crankshaft on all main bearings and a 3¼-in. shaft on the rod bearings. Lubrication is by a double-gear pump system. The torque, the makers say, is 770-lbs. at 500 to 700-r.p.m. and the engine weighs 3550-lbs.

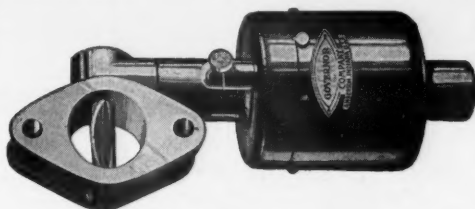
With this engine (Model E) the Wisconsin line includes sizes from 20-h.p. to 150-h.p. in both 4-cylinder and 6-cylinder models.

The Pierce Governor Co. calls attention to the fact that manufacturers using Pierce governors on industrial and automatic machinery have increased from 250 to 348 recently. The list includes makers of air compressors, power shovels, hoists, loaders, conveyors and other handling machinery.

This growth has come from the increasing use of internal combustion engines in industrial work and the recognition that a

dependable governor is an essential part of the equipment for such work.

Diesel engine development is very much widening the field in which this class of prime movers may be used. For a long time development had been confined to the larger sizes but in the past year smaller units received much consideration. Fairbanks, Morse and Co. brought out models



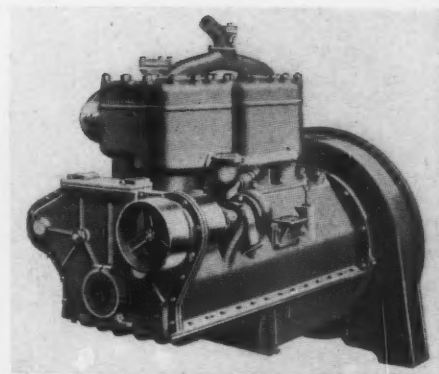
An internal combustion engine governor

which can compete with gasoline engines of similar sizes.

Among these may be mentioned a 15-hp. motor running at 600-r.p.m. and a 60-hp., 800-r.p.m. used in excavating equipment driving conveyors and similar service; a 35-kw. set with Diesel engine directly connected to generator and exciter operating at 720-r.p.m. and a 40-kw. direct current set with Diesel engine operating at 800-r.p.m.

Diesel Lightness Attained by Design

The higher speed and lighter weight engines are in a full line from 30-hp. to 180-hp. Lightness of weight has been attained by *design*, not by sparing metal where it might be needed, but by changing dimensions of parts, valves and other features so that an engine of the same weight would give increased power. The effect of this has been to lower the price per horsepower (which is the only price in which the con-



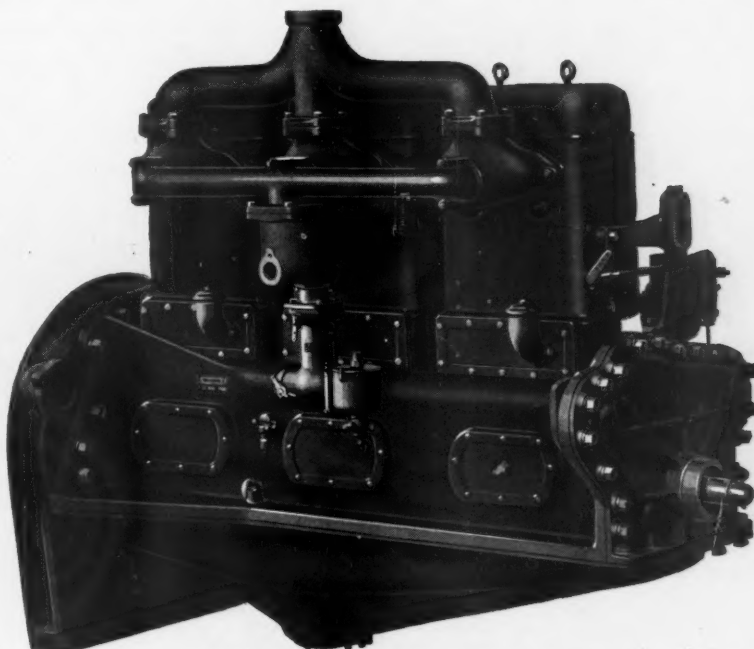
New four-cylinder gas engine with force feed lubrication system

sumer is interested) considerably, and make it possible to use a full-Diesel engine where an engine of such a type would not have been considered previously.

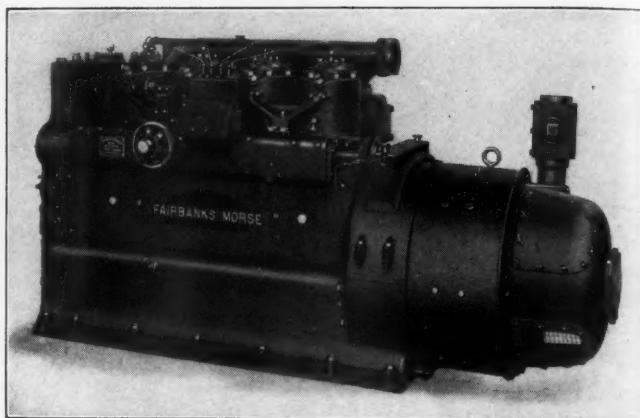
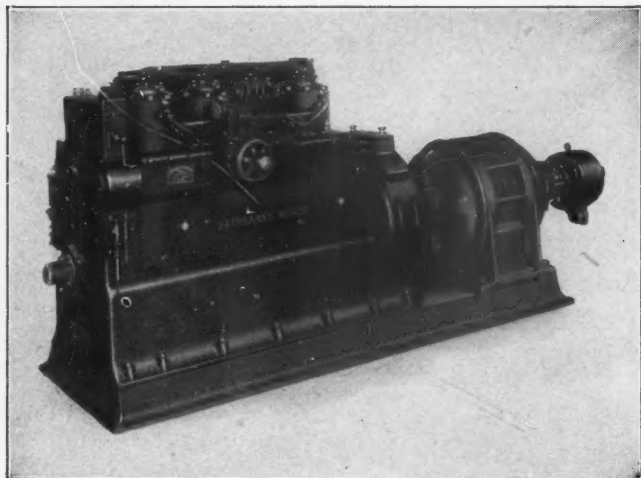
Fairbanks, Morse and Co. have furnished the following interesting explanation of the work of these new higher speed and lighter weight engines:

"The fuel is sprayed through a nozzle located at the top of the cylinder and the injection of the fuel is timed so that it enters the combustion chamber at about the time the piston reaches the top of its stroke.

"The difference between the gasoline engine and the Diesel engine is the fact that the Diesel engine ignites the charge of fuel oil by the heat of compression. The compression pressure in a Diesel engine, that is the pressure of the air at the top of the cylinder when the piston is in its highest position, is about 500 pounds per square inch. In the gasoline engine this pressure is about 50 pounds per square inch. When the air is suddenly compressed to 500 pounds the temperature rises to approximately 1000 deg. F.



New six-cylinder engine designed to use kerosene or gasoline



Back and front views of one of the new full-Diesel engines of lighter weight and made in lower horsepowers than were formerly considered practical

"When the fuel in the combustion chamber above the cylinder proper is ignited by the heat of the highly compressed air, the fuel charge begins to burn and the burning gases expand out into the cylinder driving the piston down. The combustion of the fuel is not rapid as it is in the case of the gasoline engine. There is no explosive action but rather a slow burning of the fuel so that the action is more nearly like that of steam in a steam engine. The piston moves down and first uncovers the edge of the exhaust port and the burned gases expand into the exhaust manifold. As the piston moves on a slight distance further it uncovers the air inlet port and the air in the crank case which has been slightly compressed by the downward movement of the piston flows up through this air inlet port and blows out the remaining burned gases. The cylinder is now charged with a fresh supply of air, the piston begins to move upward, closing the air inlet and exhaust ports, and the cycle is repeated. As the piston moves up a new supply of fresh air is drawn through the valves in the crank case.

"This is all there is to the operation of a modern two-cycle, airless injection Diesel engine. There are, however, other types of Diesel engines, such as the four-cycle air injection type. The four-cycle engine requires both inlet and exhaust valves, which require proper setting to produce the best efficiency and which must be frequently ground in order to keep the engine in good operating condition. The air injection Diesel requires the use of high pressure air for atomizing the fuel oil. That is, in this type of engine, air at about 1,000 to 1,200 pounds pressure is carried to the tip of the injection nozzle and the fuel is suddenly blown into the engine and atomized by this method. In this case the fuel is usually blown directly into the cylinder itself.

By using the combustion chamber just above the cylinder the same effect is ob-

tained as when high pressure air is used but without having the added complication of a multi-stage air compressor.

An important unit is the direct connection to the engine of a small alternating current generator with direct connected exciter. This is the first time that a full Diesel engine, alternating current generating set has been available in sizes as small as 36-kw. Since this small engine is just as efficient as the large Diesel engine, the small generating set makes it possible for the power user who has a comparatively small load to get the same economy as the largest users of power. Since this Diesel engine is a self contained units its installation is as simple as that of a gasoline engine.

"The big advance of the Diesel engine is the low fuel cost. The full Diesel, that is the high compression type, will burn very low grades of fuel and will burn them more efficiently than the lower compression or semi-Diesel types of engine. It is readily seen that the higher the compression, the higher the generating temperature and hence the more complete is the burning of the fuel. It is for this reason that the Diesel engine is more efficient than the gasoline engine. The gasoline engine requires a higher grade of fuel but, since it burns it less efficiently than does the Diesel engine, it requires more fuel. Fuel for Diesel engines can be purchased for from 3 to 8 cents per gallon, depending on the locality and the quantity which is bought.

"The new Fairbanks-Morse Diesel is equipped with both manual and governor control. In this control a half turn of the small regulator shown just a little above the center of the engine, will vary the speed through a wide range. Where the engine is to be operated for long periods at a slow speed the governor control wheel is turned and the engine operates at this slow speed under governor control, that is the speed will not vary over or under the speed for which the governor is set.

"These engines are started with compressed air at a pressure of about 250 pounds which is supplied by a small air compressor and stored in small tanks. The engines start instantly, and the starting of the largest Diesel engine is easier than starting an automobile engine.

"The reliability of Diesel engines has been greatly improved in the past few years by improved manufacturing methods. There has been as much progress made in the building of Diesel engines as there has been in the building of automobile engines. In fact the modern Diesel engine is as well built as the engine in the highest priced automobile. This holds true not only in the small Diesel engines but also for the larger sizes as well."

Several installations of these Fairbanks-Morse Diesel engines were made in the rock products field in 1927. Among them may be mentioned: Mogadore Sand and Gravel Co., Mogadore, Ohio, a 300-hp. engine and direct-connected alternator; Kanawha Sand Co., Parkersburg, W. Va., 80-hp. marine engine for a new towboat; River Sand Co., Steubenville, Ohio, 180-hp. marine engine on a "sand digger"; Elberton Quarries, Berkely, Ga., a 240-hp. engine direct connected to air compressor; Dixie Sand and Gravel Co., Chattanooga, Tenn., 120-hp. marine engine for towboat; Columbus Gravel Co., Columbus, Miss., a 300-hp. engine for sand and gravel plant.

New Magnetic Pulley

A new magnetic pulley, the "High Duty," for separating tramp iron from other materials has been brought out by the Magnetic Manufacturing Co., Milwaukee, Wis., the principal feature of which is its one-piece body construction. This is said to provide unrestricted flow of the magnetic lines, thus increasing the efficiency of the pulley. Several of these pulleys have been installed in Eastern quarries and crushed slag plants.

Electrical Equipment

MANY IMPROVEMENTS have been made in the types of power equipment for rock products operations. An article on selection and protection of electric motors was published in *Rock Products*, April 30, and another on the selection of motor controls in the August 6 issue. During the year the following new General Electric Co. developments were described: Type F T induction motors, April 30; totally enclosed motors for mine hoists, October 25; improved recording instrument, January 22; float switch, May 28; magnetic switch, June 25, and boiler plate enclosing cases, November 26. The Westinghouse Electric and Manufacturing Co. developments described included new distribution transformers, August 20; mine hoist motor, July 23. The Baldwin-Westinghouse mine locomotive was described in the August 6 issue. Other descriptions included a new all-steel ball-bearing induction motor, October 1, and the "Stable-Arc" welder, April 16 issue, both products of the Lincoln Electric Co. and the Electric Controller and Manufacturing Co.'s rotating cam switch, July 23.

Electric Motors

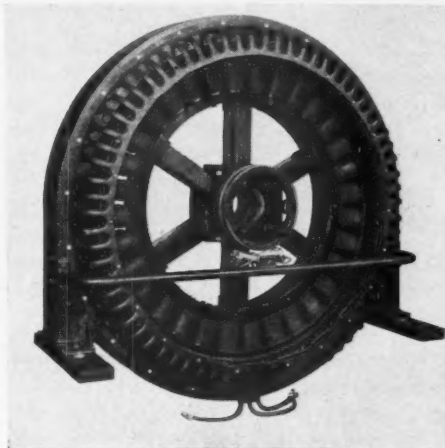
In addition to the electric motors already referred to, the Westinghouse company has brought out a new linestart motor operated by a push button line start. The low current characteristic of the "Linestart" motor allows starting directly from the line. This motor is provided with either a starting torque which compares with standard squirrel cage motors or with a starting torque of two to two and one-half times full load torque. The high torque "Linestart" motor is used for driving such machines as compressors, plunger pumps, conveyors and others where a heavy load is to be started. A manual starter may be used with this motor.

The Westinghouse company has also

brought out new low speed synchronous motor of arc welded construction.

This motor has been designed for high efficiency at all loads within its normal operating range. The excitation has been materially reduced, thus it is said increasing the efficiency and cutting operating costs. A starting torque of 50% and a pull in torque of 40% are features of this new motor. The disturbance on the line is correspondingly reduced.

The shape of the rotor arms in this new

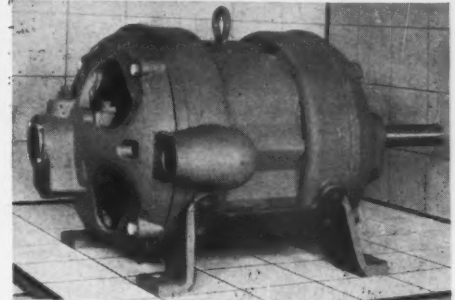


Linestart motor operated by push button

motor is such that a large amount of air is set in motion. This cooling air is so directed that it not only passes through the stator coils but it also passes over a large area of the stator laminations as well. By means of different weight rings bolted to the rotor rim, six possible values of flywheel effect are available. This motor is for driving air compressors, although in the coupled type it can be used with pumps and other slow speed machinery.

The General Electric Co. brought out a

new low-speed synchronous motor designed for across-the-line-starting, rated at 350 hp. The features of its totally-enclosed fan-cooled d. c. motors were applied to a similar line of induction motors. These motors are included for operation on two or three-phase, 60-cycle circuits and are available in



New synchronous motor of arc-welded construction

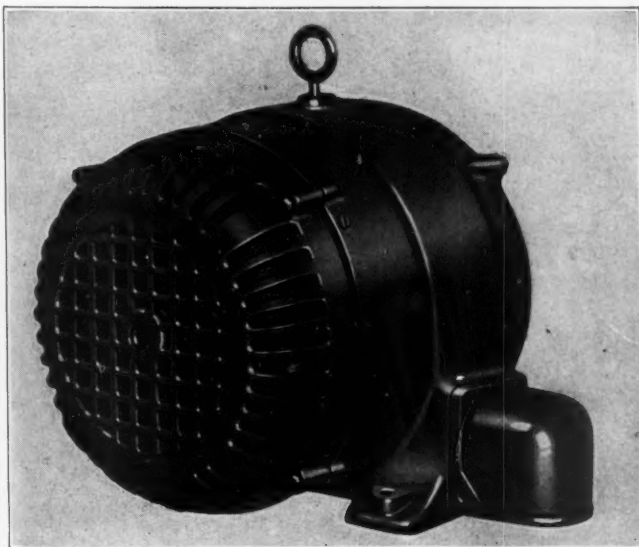
ratings from two to 15 hp., 220, 440 and 550-v.

Either ball bearings or sleeve bearings can be used and the dimensions of the motors are such that either type of bearing may be used interchangeably.

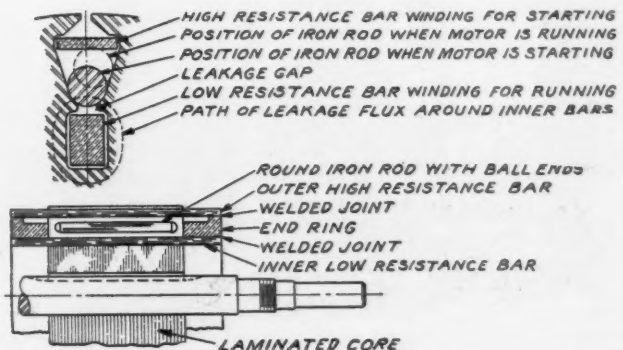
Improvements were also made in larger induction motors of the totally-enclosed fan-cooled type which permitted their construction in smaller frames, for a given capacity than had previously been possible. By means of a longer end-shield on the end opposite the pulley, the slip-ring type of motor can be adapted for this construction.

A new cartridge-type of ball-bearing housing was provided which is so constructed that by taking out the screws locking the housings to the end-shields the rotor can be removed with the housings still around the ball bearings. This new type of ball-bearing housing has been so far adopted only for the relatively smaller sizes of general-purpose motors.

A new line of high-reactance normal-torque squirrel-cage induction motors was designed for full-voltage starting by means of a small magnetic line switch. It has as good and in some cases slightly better starting torque with the same starting current as the ordinary squirrel-cage type of motor started with a compensator. It is now avail-



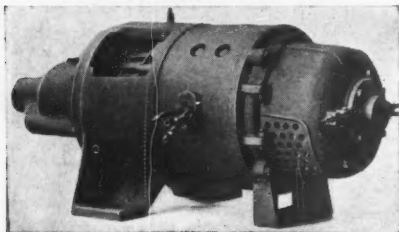
New enclosed self ventilated motor with air cleaning feature



An improvement in double squirrel cage motors consists in the use of loose iron rods in each rotor slot between the inner and outer bars

able in ratings from $7\frac{1}{2}$ to 100 hp.; and up to 30 hp. these machines will meet the accepted limits of starting current even when started on full voltage.

Fairbanks-Morse and Co. have developed a line of enclosed self-ventilating motors which have an interesting air cleaning feature. This motor has a standard stator and rotor mounted with an annular passage between the outside surface of the stator core and the supporting shell. Cooling air is drawn through an inlet opening at the free end of the motor by means of a special type fan which also functions as an air cleaner. The air is blown across the shield at the

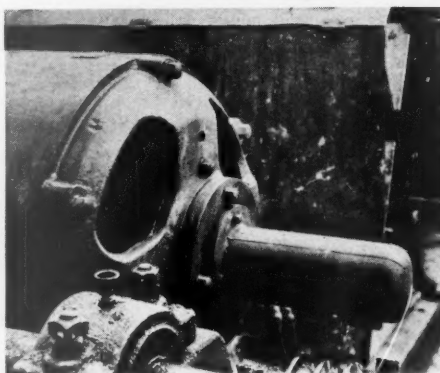


New 3-kw. turbine generator unit

free end of the motor, through the air space, then across the outer end of the stator core, thence across the shield at the pulley end and out through openings in the pulley end bearing arm.

The important advantage of this type of motor lies in that it is completely self-ventilated and cleans its own cooling air by means of a built-in automatic air cleaner, impervious to dust and air.

An improved type of the double squirrel-cage type motor is also announced by Fairbanks-Morse and Co. In the new motor loose iron rods are used in each rotor slot between the inner and outer bars, by which means the current in the inner winding is choked at starting. This is to permit most of the current to flow in the outer high resistance winding to produce a high starting torque. After starting, the iron rods are thrown out of the leakage gaps by centrifugal force and the choking effect removed.



Bearing housing on channeler motor

Better running performance is claimed for this type of motor.

In the review on cement, mention was made of the new "Hi-Tork" motor, recently developed by Allis-Chalmers Manufacturing Co. for driving heavy machinery such as tube mills without the use of a clutch. One of the first installations of these motors was made at the Kosmos Portland Cement Co. and another is to be made at the new Thomaston, Me., plant of the Lawrence Portland Cement Co.

Turbine Generators

A direct-connected turbine generator unit having a rating of 3 kw. at 125-v. d. c. has been recently placed on the market by the Westinghouse Electric and Manufacturing Co. This apparatus has been developed as small non-condensing steam turbine generator lighting set for use with steam shovels, isolated pumping plants and for general outdoor construction work. The generator coils are specially impregnated and all parts requiring such protection are standardized.

The generator is ventilated by a fan mounted on the shaft between the inboard generator bearing and the turbine casing. The unit runs on two heavy single row ball bearings. Grease is used for lubrication.

Switches

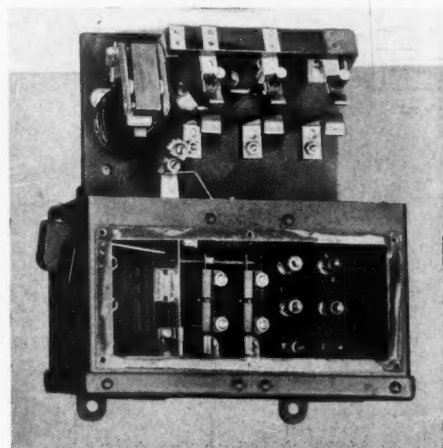
The General Electric Co. announces three small switches for miscellaneous application

as across-the-line reversing switches for small motors. The CR-7009-F-1 and F-2 switches each consist of two 15-amp., double-pole contactors electrically and mechanically interlocked and enclosed in a drawn-shell enclosing case. They are for use with momentary-contact push-button stations. The F-1 form is without overload relays, while the F-2 form has Trumbull overload relays. The CR-7009-B-10 switch consists of two three-pole, 25-amp. contactors mechanically and electrically interlocked. The switch is for use with a momentary-contact push-button station and has Trumbull overload relays.

All these switches are enclosed in a new type, drawn-shell enclosing case.

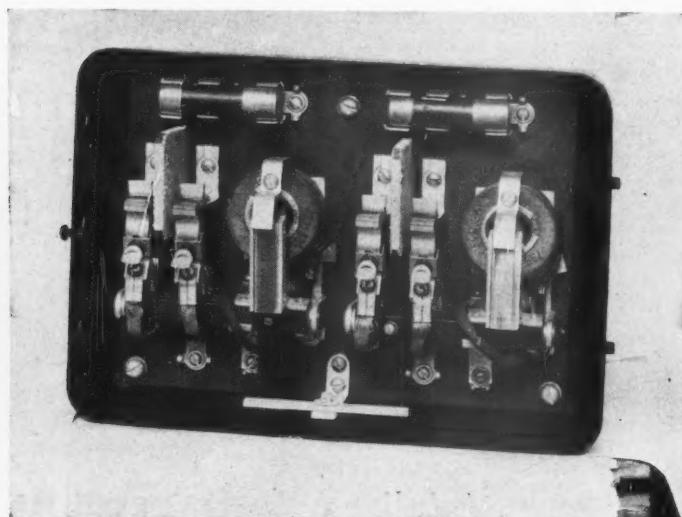
Starters

The Westinghouse company has brought out a line of magnetic voltage starters for

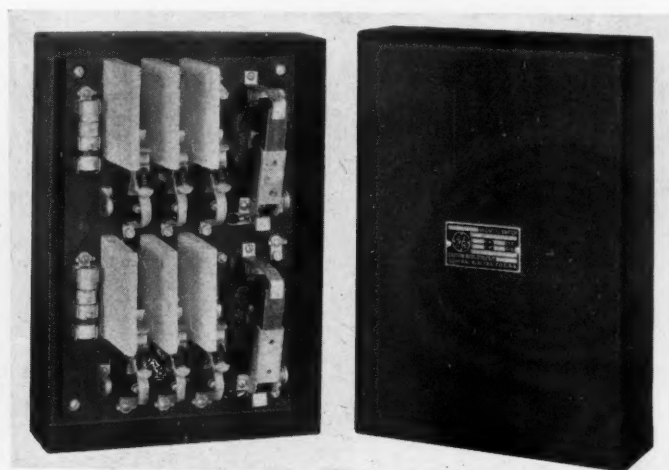


New oil-immersed line starter

slow and medium speed synchronous motors, 20-1100 hp. 3-phase, 20 to 60 cycles, 220, 440, 550 and 2200 v. The control functions are automatically performed, a simple master switch being used to start and stop. Protection is provided against sustained overloads, loss of excitation, low voltage and single-phase operation.



Small switch with two three-pole contactors

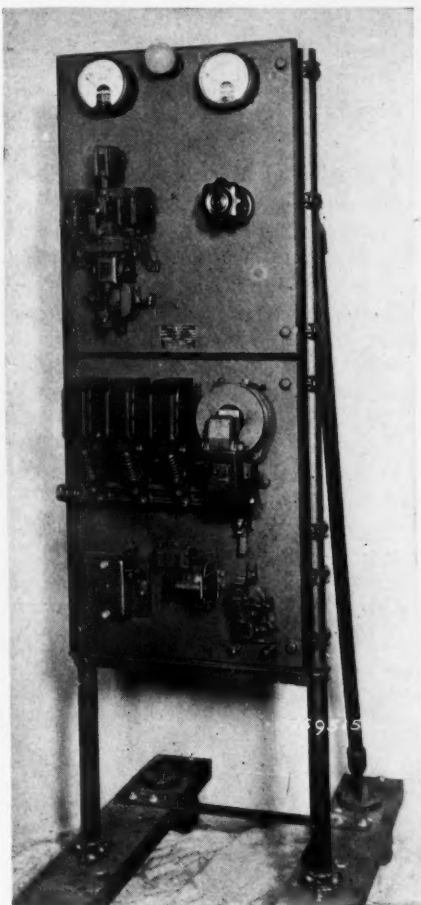


Reversing magnetic switch with two-pole contactors and overload relays

The Westinghouse oil-immersed line-starter for squirrel-cage motors is so arranged that under overload, a small heat coil causes a bi-metal strip to deflect and trip out the contactor coil circuit, thus cutting off power. Thermal relay is above and contactor below. Immersion in oil is intended for dusty places or those subject to explosive or corrosive fumes.

Welding Equipment

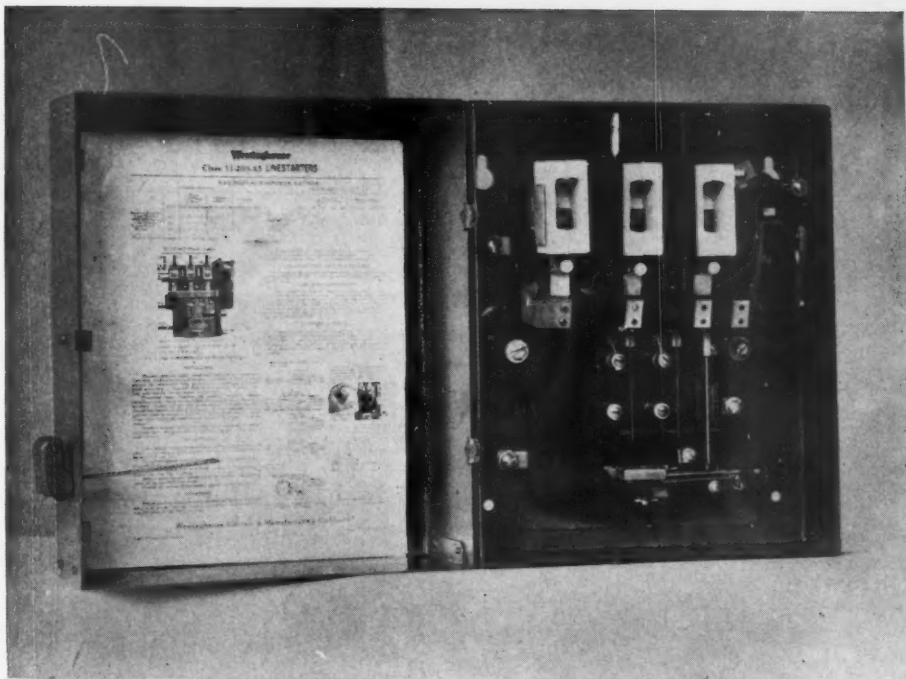
The General Electric Co. announces an-



Control panel of new linestarter for synchronous motors

other addition to its line of welding equipment, a small engine driven welding outfit. This set incorporates the G. E. WD-11 welding generator with a continuous rating of 150 amperes and a one-hour rating of 200 amperes, the current range running from 50 to 250 amperes. The generator is driven by a Continental P-20, power unit rated 18.22 hp. and capable of developing 23.5 hp. at 1400 r.p.m. The generator is equipped with a control panel, rheostat and self-adjusting stabilizing reactor.

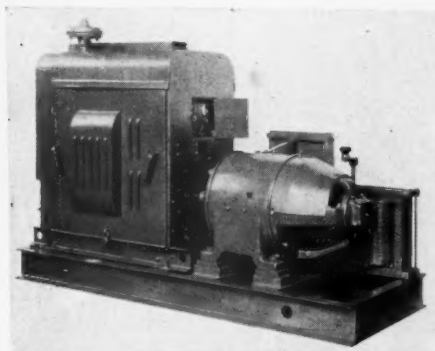
The atomic hydro-



New linestarter for squirrel cage or linestart motor

gen arc welding development work has been completed by the General Electric Co. and a commercial equipment produced for 60-cycle circuits. This process was described in ROCK PRODUCTS, October 29.

The Westinghouse company has developed a new automatic welder for longitudinal seams, which will handle pipe or tank varying in diameter from 10 to 40 in. and up to 8 ft. in length. A portable welding arc welding set, 200 amp. designed for one-man



Small-sized gas engine driven welder



New portable one-man operated welding set rated at 200 amp.

operation is also announced by the company. The motor and generator are mounted as a unit, a single shaft serving both machines. The motor of the motor-generator set is controlled by a magnetic line starter and operated by a push-button switch. The welding current is controlled by a single resistor in the d. c. generator field.

A new single-operator welder rated 300 amp., one hour, 50 deg. C. temperature rise, is announced by the General Electric Co., Schenectady, N. Y., as the latest addition to its standard line of welding equipment. This machine includes a four-bearing, ball-bearing, motor-generator set with flexible coupling. With this equipment the manufacturers claim a rapid and simple interchange of motors may be made by the user.

The generator is designed to permit belt, motor or engine drive, and will be designed for either stationary or portable use. It can be used as both a manufacturing and a repair tool.



Single operator welder rated at 300 amp.

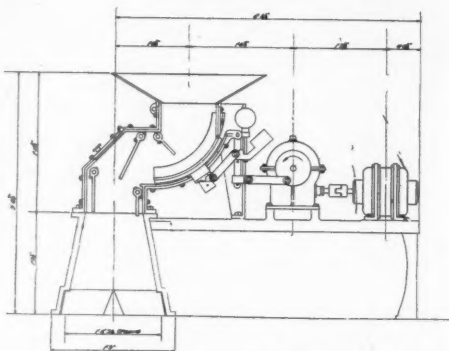
Lime Kilns and Hydrators

GENERAL improvements and developments in the manufacture of lime have been discussed elsewhere in this issue. Several of the mechanical developments have been improved, notably the Ward stoker or automatic coal feeder brought out in 1926 by Arnold and Weigel, Woodville, Ohio. The operation principle and the advantages of this stoker were described in the December 25, 1926, issue and are generally familiar to our readers, so only the improvements will be detailed.

The earlier type of Ward stoker was operated by a closed circuit water-pressure system but this has been eliminated in the new design. The feeder now comprises a swinging pusher plate, actuated by an eccentric from a small speed reducer direct-connected to a small electric motor. It rests directly on top of the fire box, sprinkling the coal over and through a spreader and evenly on the fire bed. The stoker operates continuously at the rate of 12 strokes per minute. Coal from $\frac{1}{2}$ -in. down to dust can be fed to kilns at the rate of 500 lb. in 24 hr. up to 30 tons in 24 hr., thus assuring a variable capacity, according to the manufacturers. The coal is brought to the stoker by an overhead hopper fed from a conveyor.

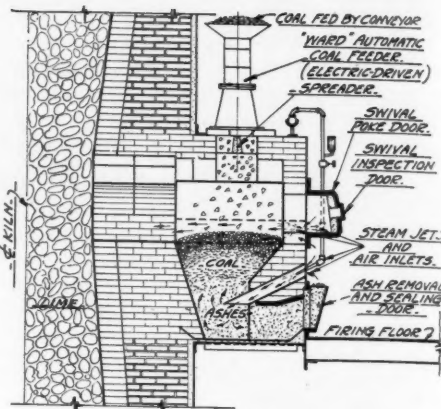
The Ward automatic electric stoker requires special castings on the furnace fronts and other features of construction which have been incorporated in the standard Arnold kiln. Its use is not restricted to the Arnold kiln, but can be adapted to any kiln

using the external fire box method of firing. Stone or brick-front furnaces can be re-modeled by making the changes in the brick-work to accommodate the special castings and other construction details. Kilns using fuel oil, or grates for coal or wood may be adapted to this method of firing also.



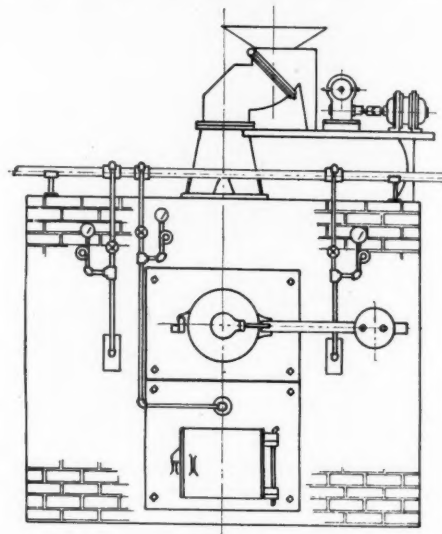
General dimensions of automatic coal feeder

The special fire box construction for use with the Ward stoker and the method of operation are illustrated herewith. The furnace has no grates but simply a fuel bed into which the steam and air are injected directly; the effect being similar to a gas producer. The fire is built on top of the dead ashes in the ash pit, the ashes being removed at intervals by shoveling from under the bed of live coal, which bridges over from wall to wall. Poke holes are only opened at drawing periods.



Cross section of kiln firebox showing method of operation

Two styles of Ward automatic stokers, a right and left hand machine, illustrated herewith, are built. The right hand machine is more commonly used on both sides of the kiln and is furnished as standard. Where two stokers are to be fed from a common spout, the hoppers are set facing each other, which requires a right and left hand machine, in order to keep the operating levers on both machines to the front of the fire box, making adjustments accessible. The



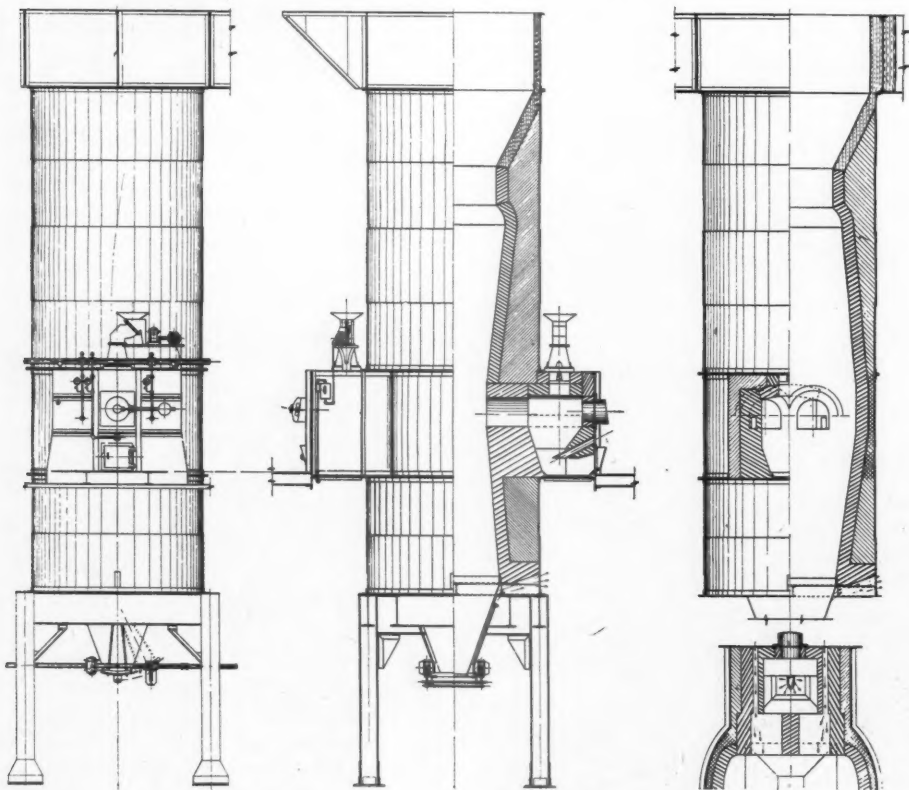
Method of applying automatic coal feeder to brick front kilns

feeders may be also set at right angles to the front of the furnace.

Lime Putty and Mixed Mortar Plants

H. Miscampbell has recently designed a new lime putty mixed-mortar plant which is also adapted for the manufacture of plaster and stucco. The design is illustrated herewith and the essentials are described as follows:

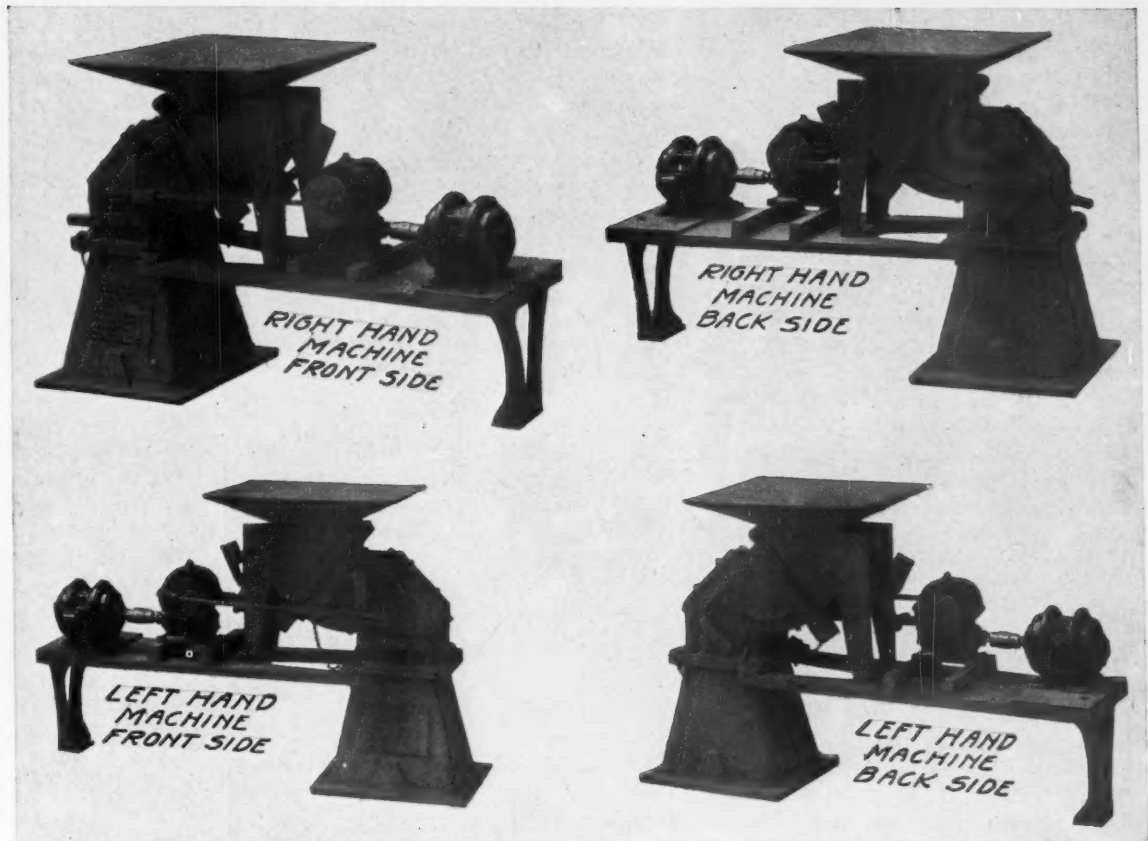
The crushed lime is elevated to a 4-ton bin, from where it is brought down by gravity through a weighing hopper to the milk-of-lime mixer. The water is also measured into the mixer to assure exact mixes. The milk-of-lime is screened into a vat from which it is pumped to three curing bins



Application of automatic coal feeder to shaft kilns

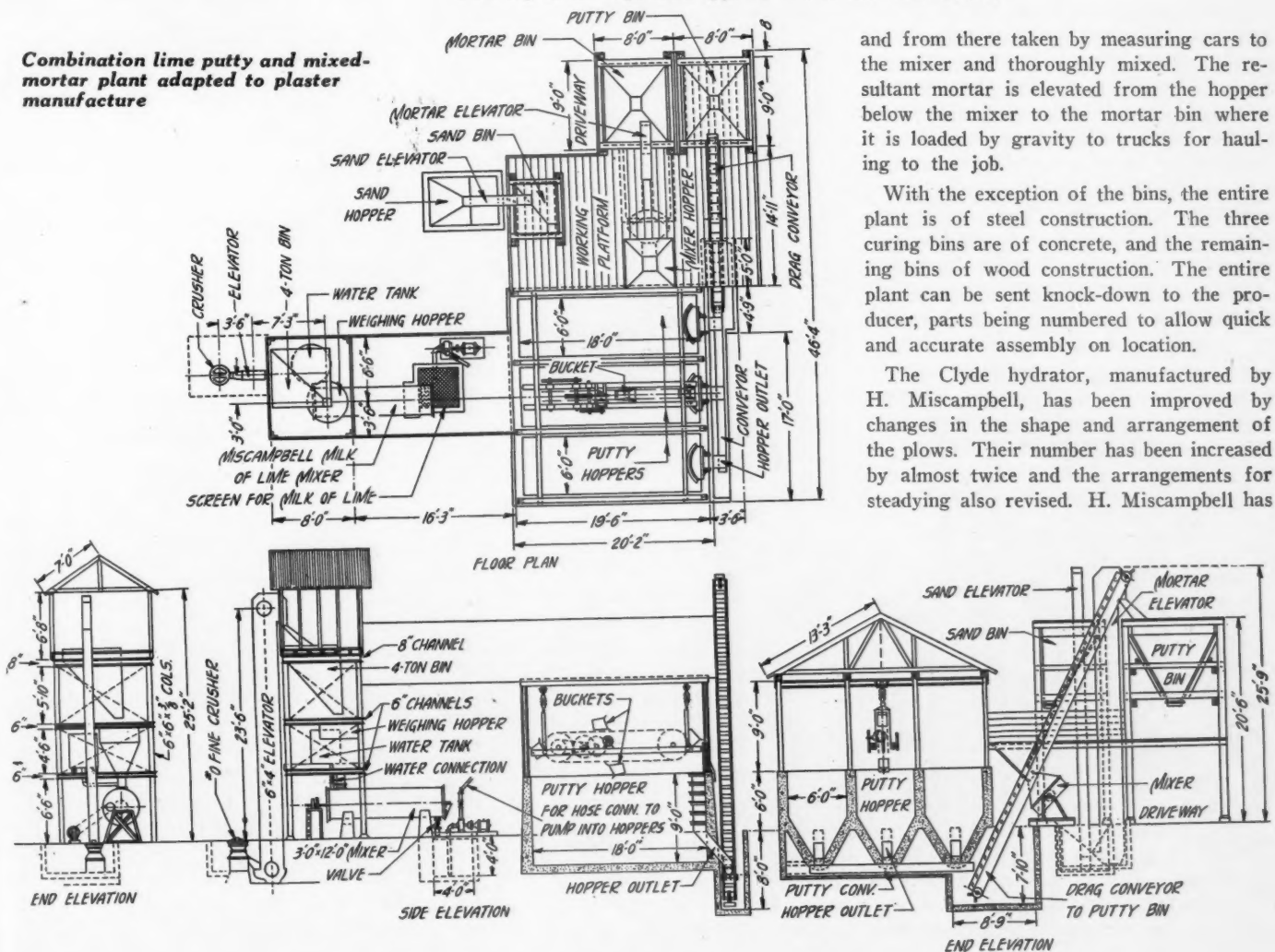
built entirely below the surface of the ground or above. Curing bins are emptied by means of a horizontal belt and bucket conveyor, suspended by block and tackle from an overhead trolley. The conveyor serves the three bins of the plant and also any number of additional bins which may be erected. The buckets discharge the putty to a hopper feeding a screw conveyor running to the foot of a drag elevator which elevates the material to a putty bin. The putty dumps by gravity to trucks below the bins.

When mortar is desired the putty is taken from the above putty bin by measuring cars to a mixer. The sand used is elevated to a sand bin



Two styles of improved type of automatic coal feeder

Combination lime putty and mixed-mortar plant adapted to plaster manufacture



and from there taken by measuring cars to the mixer and thoroughly mixed. The resultant mortar is elevated from the hopper below the mixer to the mortar bin where it is loaded by gravity to trucks for hauling to the job.

With the exception of the bins, the entire plant is of steel construction. The three curing bins are of concrete, and the remaining bins are of wood construction. The entire plant can be sent knock-down to the producer, parts being numbered to allow quick and accurate assembly on location.

The Clyde hydrator, manufactured by H. Miscampbell, has been improved by changes in the shape and arrangement of the plows. Their number has been increased by almost twice and the arrangements for steadying also revised. H. Miscampbell has

also designed a combined continuous and batch hydrate plant, the principal features of which are given herewith:

An adjustable plate feeder under the ground lime bin feeds desired amounts of lime and a water meter governs the amount of gaging water. The lime is worked up in a wet pug mill and passed to the hydrator where the fluffiest portion overflows at the opposite end from the feeder under and over baffle plates in the hydrator drum. This overflow arrangement is a late improvement designed to catch and save the fluffy portions of hydrate, regarded by many producers as the best portion of the hydrate. The overflow discharges into a screw conveyor feeding a Raymond mill, while the tailings and overburnt portions remain behind in the bottom of the hydrator. When tailings are to be cleaned out, the trap in the hydrator bottom is raised by a screw

and the tailings passed to the Raymond mill to recover any hydrate and the unhydrated particles rejected. The hydrator may be adjusted to keep each batch of lime in the machine for at least 20 minutes.

The arrangement developed by Raymond Bros. Impact Pulverizer Co., Chicago, for producing both chemical hydrate and standard hydrate through the use of a double unit air separation system was described and illustrated in *ROCK PRODUCTS*, November 26 issue. The Vulcan automatic continuous lime hydrator, machine or hand operated, was described in the April 2 issue.

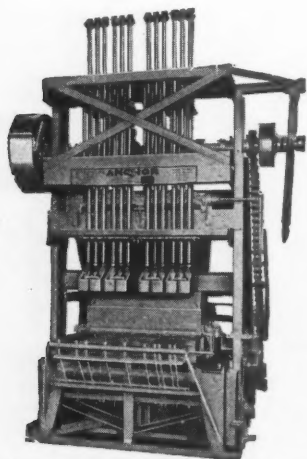
Lime Packages

The Pittsburgh Steel Drum Co., Pittsburgh, Penn., has added small and medium sized assembled cans and drums and just recently developed a completely removable-head container.

Cement Products Machinery

THE big quantity demand for concrete building units is for the plain faced blocks—blocks without special face design or facing mixture—blocks that are stripped from the molding machine. This trend has led the Anchor division of the Consolidated Concrete Machinery Corp., Adrian, Mich., to bring out a double power stripper that will make two plain faced blocks at one operation and be practically automatic. This unit is for the large producer of concrete masonry units and is said to be the largest production machine on the market.

An improved apron feeder feeds the concrete to the tamping feet, which in turn distribute the concrete evenly in the mold box, giving it a remixing action. This improved feeding method results in important gains in the strength of the finished unit.

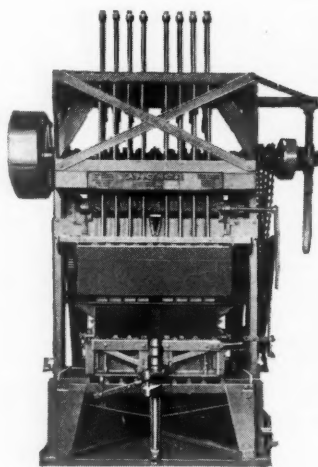


Four-unit power tile machine

The Anchor single power stripper was redesigned in 1927 to conform to the lines of the double model. An attachment was perfected for branding the block as it is

manufactured with the maker's trade mark or other insignia. Another attachment was introduced that can be fitted to all Anchor stripper models, for making rock-face block on the stripper type of machine.

During the year the Anchor division announced a large capacity machine for



Double power stripper

making concrete wall tile. This new model makes four tile, 5x8x12 in., at each operation. Tile of the standard two-core type or the patented "high test" type may be made. The lightweight tile unit is becoming increasingly popular and the Anchor line now includes three models for making tile in various daily capacities.

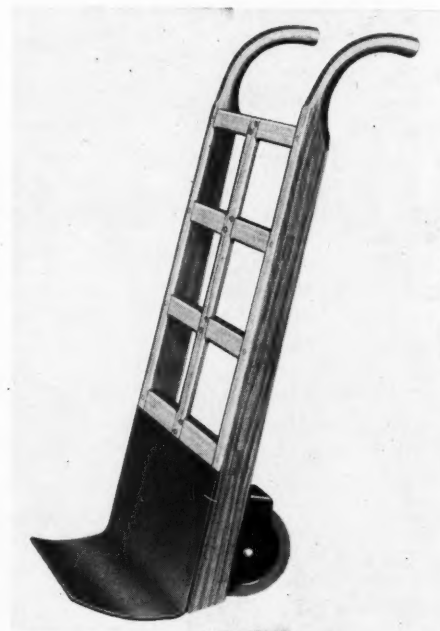
The Anchor division also brought out the "Hobbs Big Boy," a heavy duty block machine installed with the power tamping equipment all in one unit. This was described in *ROCK PRODUCTS*, November 12.

F. Komnick Machinery Co., Elbing, Germany, are installing equipment for the manufacture of "Ternolit," an asbestos-cement

roofing shingle, at the Ruberoid Co.'s new plant at Joliet, Ill. This process will be described in detail in a later issue of *ROCK PRODUCTS*.

New Bag Trucks

THE Bates Valve Bag Corp. has brought out a new bag truck for handling pulverized bagged material. The wheels are equipped with ball bearings and heavy rubber tires and with Alemite fittings for lubrication. The nose plate is of steel with a



New truck for handling bagged material

specially designed curve claimed to permit easy loading and discharging. The design also features good balance, light weight and absence of projecting nuts, screws, etc., on which bags might be damaged.

Merger of Machinery Manufacturers Announced

AN important merger of construction machinery manufacturers was recently completed when the Byers Machine Co., Ravenna, O., acquired the Massillon Power Shovel Co. of Massillon, O. The Byers company has taken over all the stock of the Massillon company and assumed the entire responsibility for the distribution and selling of the Massillon line of shovels along with its own Bear Cat line. It is announced that the chief reason for the merger is to provide a complete line of shovels and cranes from ½ yd. to 1¼ yd. in size. The Byers Co. will continue its line of ½ yd. and ¾-yd. shovels and the larger sizes of shovels will be manufactured by the Massillon company. The latter will also continue the manufacture of steam shovels, as well as its line of gasoline shovels.

Dust Collectors

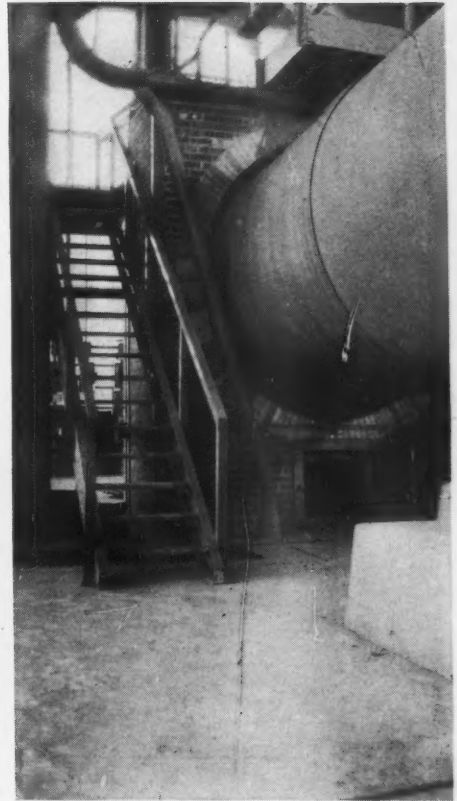
ARTICLES on dust collectors published during the year include: McLeod Co.'s exhaust fan for pulverized material (Jan. 8); Norblo dust arrester screen vibrator (Dec. 10); Smith-Monroe compressed air separator (July 23).

The W. W. Sly Manufacturing Co. made two important developments in its machines for collecting dust and cooling cement. The first of these is the continuous arrester and the second is the application of the principle to the cooling of cement.

The continuous arrester may be described as two dust arresters with a classifying chamber between. Only one unit is in operation at a time while the intake draft is diverted to the other. The screens in the unit not operating are rapped. This per-

mits a continuous suction into the arrester at all times.

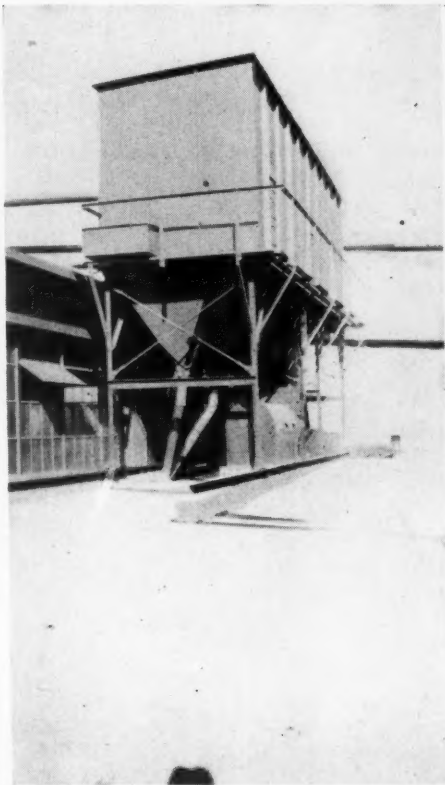
In cement cooling, due to the fact that the finish-grind mills pour a continuous stream, it is not possible or advisable to shut down the arresters at any time. Therefore, a con-



Dust pipe connections to screw conveyor under rock dryer discharge—Colorado Portland

rear of the hood with a door to remove pieces of rock that do not feed to the crusher properly. The fourth shows the dust arrester on a building with numerous pipes entering from elevators, samples and conveyors within. The fifth shows a dust collector on a mill building connected so it draws from the finish grind mills and elevators and conveyors. This is of the continuous type and the collected cement is continually conveyed to the cement storage, continuous discharge valves in the hopper operating in connection with knockers to keep the hoppers and spouts clear. The sixth picture shows the dust exhaust connections to dried rock conveyors, a typical example of the way in which a cement plant may be kept clean.

The Northern Blower Co.'s new "Norblo" dust arrester has several features which the



End view of dust arrester on mill building—Colorado Portland

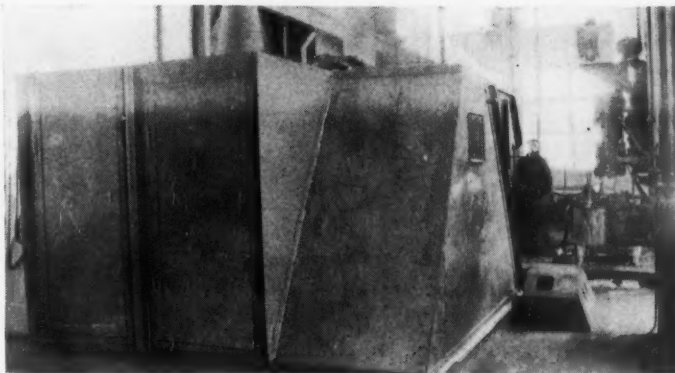


Dust collector on top of rock crusher building—Colorado Portland

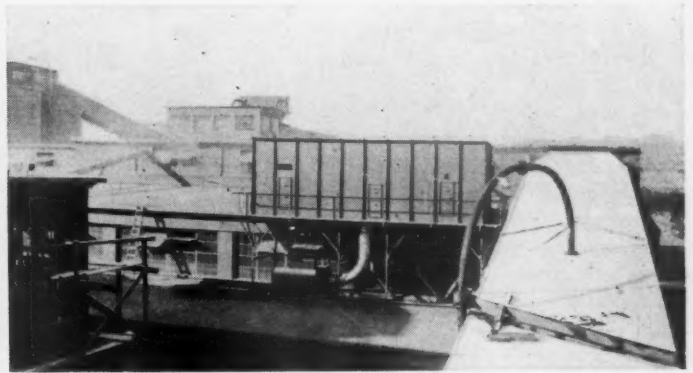
tinuous dust arrester is necessary for the cement cooling process.

The illustrations show several applications of Sly dust arresters in the rock products field. One shows two machines in a cement plant; the distant one is installed on the rock crusher building.

A second picture shows a hood for dust collection over a primary crusher into which a car of limestone is being dumped. The third photo in the series shows the

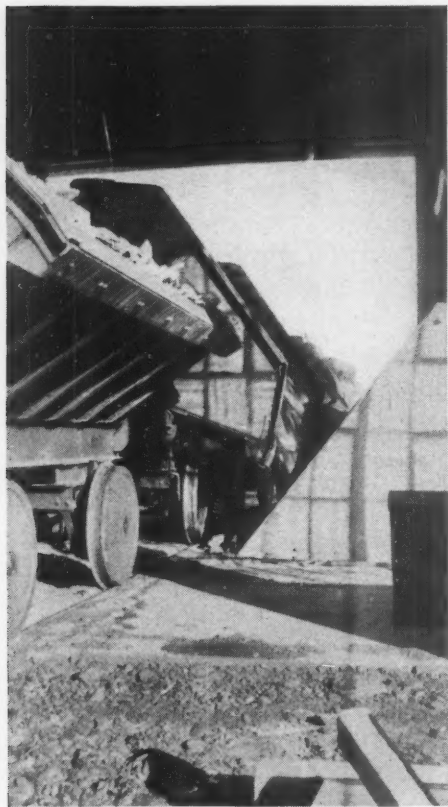


Rear view of dust housing over primary rock crusher—Colorado Portland



Dust arrester, continuous type, on roof of mill building—Colorado Portland

company says give it distinctive advantages. One of the illustrations shows the interior. The general operation is the same as in the previous design—the dusty air striking the baffle-plate (part of which is shown removed to permit the rapper mechanism to be seen), and thence passes upwards through the spaces between the screens, and through the fabric into the clean air chambers above. The new features are: The screens are



**Dust collector over primary crusher—
Colorado Portland**

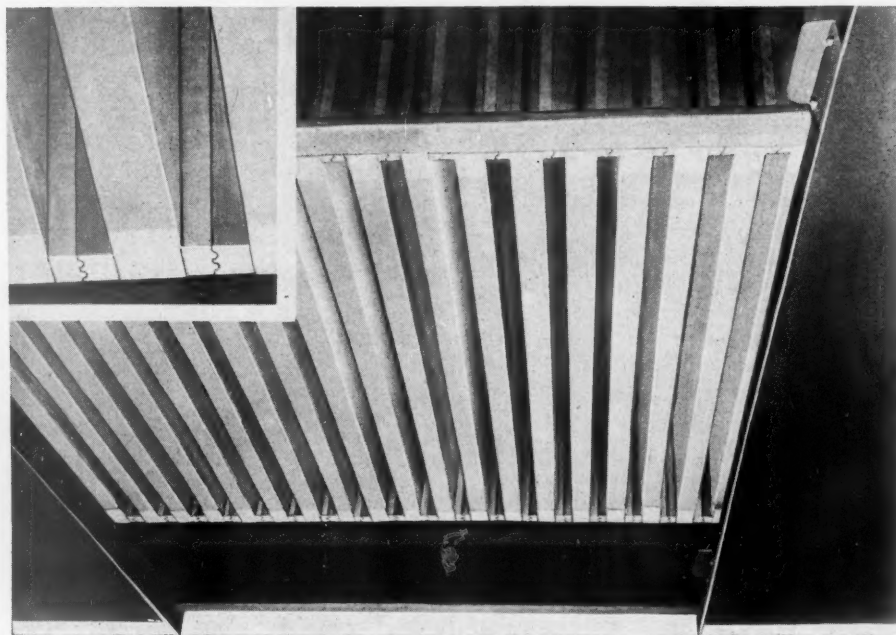
clamped in place by means of cap screws instead of the coned nuts formerly employed. This renders the screens more accessible for inspection or repair.

The separate rappers formerly used to shake the screens are replaced by a single rapping device, which runs on rails from end to end of the screens. It is electrically driven and is started by means of a push-button starting switch. The motor drives the rapper carriage slowly along the track; at the same time operating a rapping hammer which delivers a rapid succession of blows to the under side of each screen as it progresses.

The joints of the screen frames are kept airtight by means of grooved and tongued joints packed with cloth. This feature aids in lining up new or repaired screens.

This improved type of Norblo dust arrester has been already installed in several well-known plants such as the Phoenix Portland Cement Co., the Great Lakes Portland Cement Co. and the Valley Forge Cement Co.

By Products Recoveries, Inc., notes the excellent economic results that have come from the installation of its dust collectors



Showing arrangement of air filters struck by rapping device

of the reverse nozzle type in cement mills. The company's letter says in part:

"We have installed plants for two mills of the Lehigh Portland Cement Co., at

day. None of these was installed for high recovery, the customer simply wishing to make the largest commercial showing on the minimum expenditure.

"The commercial aspect of this equipment is that they reduce the raw mix 40 lb. to the barrel because of the return of the dust otherwise lost, and the three plants have recovered upwards of 300,000 tons of dust which would otherwise have gone into the surrounding country.

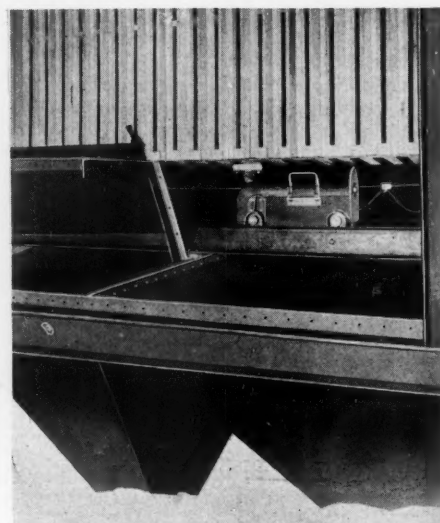
"Incidentally, we have every reason to believe that the rolling of the gas on the plates in our collector sets up minute electrostatic charges which is responsible for the adhesion of many fine particles to the surface of the boxes and in this way we recover the extremely fine dust which seems to have no gravitational factor."

The Dust Recovery and Conveying Co. made some important installations this year in the rock products industry. One, de-



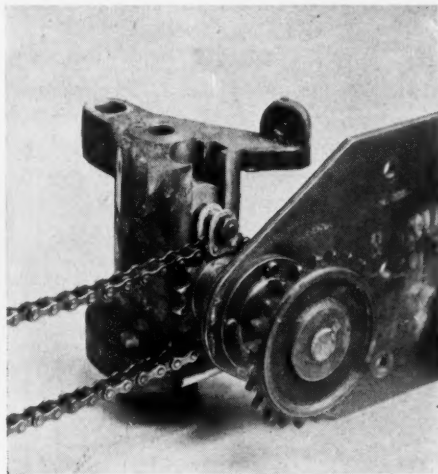
**The rapping device is started and
stopped by a push button**

Oglesby, Ill., and Mason City, Iowa, and one for the Whitehall Cement Mfg. Co. at Cementon, Pa. These handle approximately 600,000 cu. ft. of gas in the three plants, and catch upwards of 350 tons of dust a



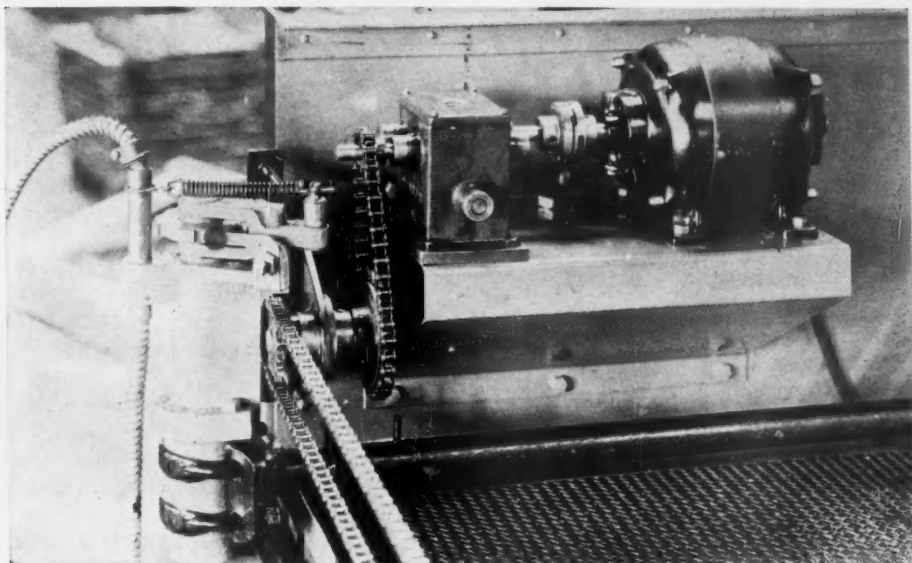
**A traveling rapping device that dis-
places separate rappers**

scribed in **Rock Products** for May 14, at the Wagner quarries, Sandusky, Ohio., was of unusual interest because of the purpose for which it was installed. The Wagner Company has specialized on the production of stone for trickling fillers which has to be



Drive of flooding mechanism for air filter

as nearly dust free as possible. The "Draco" system of dust recovery was used to draw the dust from the rock at every point where it was handled and the plant was enabled



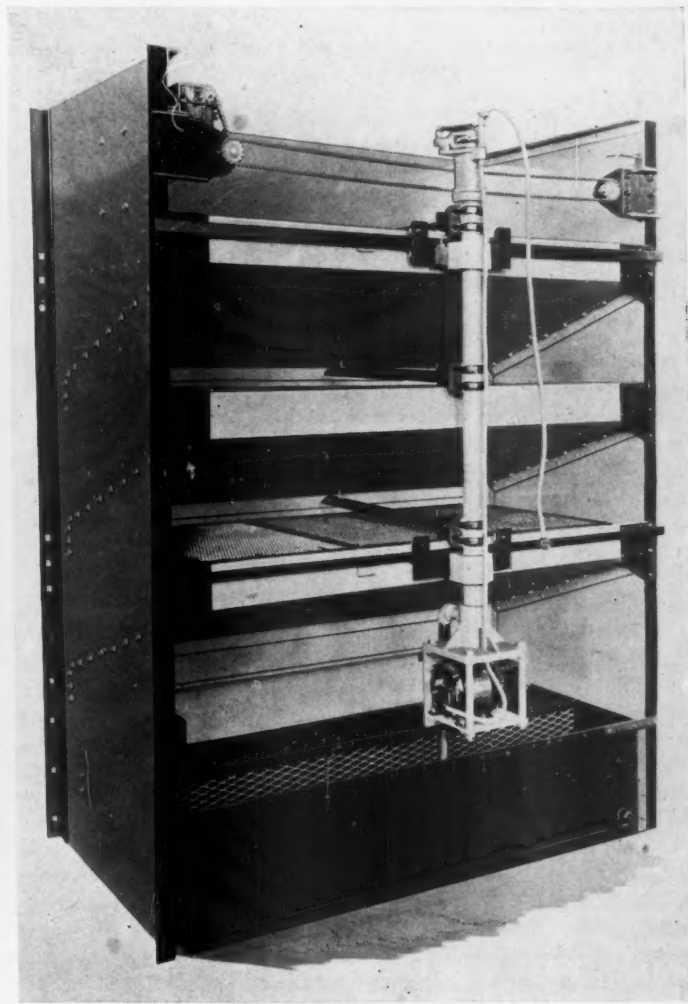
The motor-driven device that sprays the screens with a viscous liquid

in this way to produce dustless stone.

Installations are now under way at a cement plant to filter gases from kilns, recovering the dust.

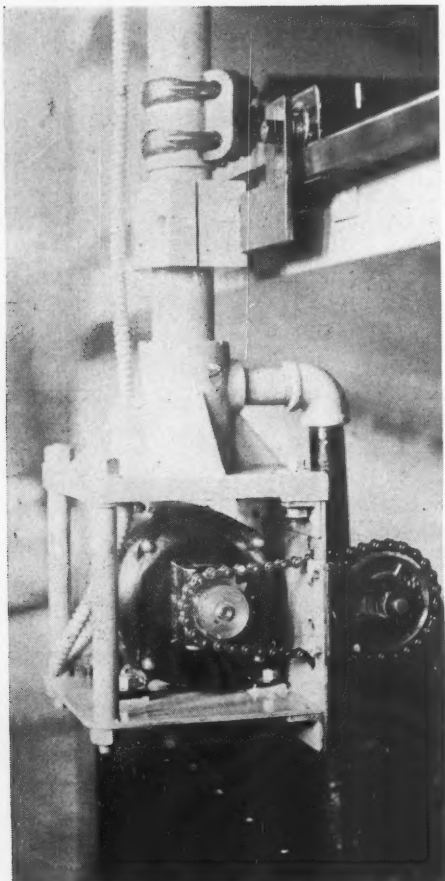
The Midwest air filter, made by Midwest Air Filters, Inc., has introduced its "Model H," of the self-cleaning type. This device works by filtering the air through sieves

which are covered with "Viscosine," a sticky fluid which catches and retains the dust particles. In the new model the dust-coated sieves are washed free from dust and new fluid is applied by a pump and motor which supplies flooding pipes that travel slowly over the screens. The excess fluid, carrying the collected dust, runs to a tank in



Front and back view of air filter. Note motor-driven flooding pipes at right

Air Separators



End view of motor, pump and pipes on air filter

which the dust is settled. Special arrangements prevent the air from passing through the portion of the screen which is being coated so that no fluid will be drawn out with the clean air. Baffle plates in a separate chamber remove the heavier dust particles, relieving the filters of this duty.

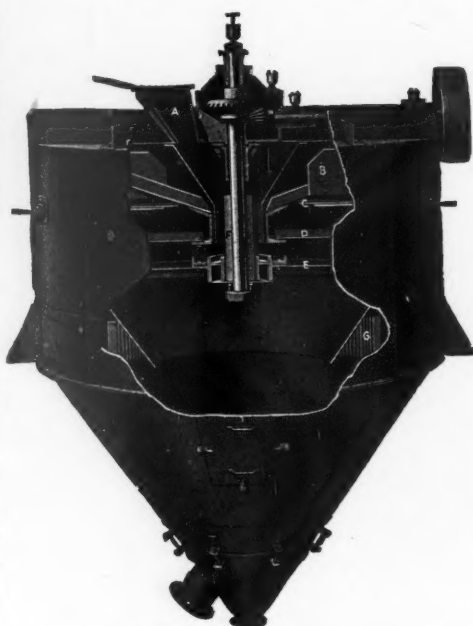
The filter was especially developed to be used in furnishing air for compressors and internal combustion engines, reducing friction, abrasion of cylinders and pistons and the sticking of valves. Filtering the air also reduces wear on rock drills and pneumatic tools. The saving in maintenance costs, especially in dusty quarries and plants is reported more than the cost of air filtering.

The company says it will guarantee the Model H filter to be so efficient that not more than 0.05 grains of dust for 1000 cu. ft. will remain in the cleaned air.

The American Blower Co. has installed a number of its "Sirocco" collectors in coal grinding plants. This collector is of the "cyclone" type, a volute into which the air enters giving the centrifugal motion by which the separation of the dust from the air is effected. Below the volute is a cylindrical casing in which are alternated truncated cone and cylinder to direct the flow in a spiral path and increase its velocity. The cleaned air or gas forms a vortex and passes up through the collector to the outlet. In the rock products industry, installations have been made in a lime and cement plant.

AMONG the articles on air separation published during the year may be noted one on Raymond Bros. air separation system for chemical hydrator, published November 26. The series of articles, "Air Separation Methods Used in the Fine Grinding of Rock Products," contained descriptions of a number of air separating devices, some quite new, even those which had not been placed on the market at the time the articles were written.

The Sturtevant Mill Co. recognized that the present sizes and types of air separators were unable to cope with the separating problems which have come from the introduction of large grinding units. To meet the demand it placed on the market a 16-ft. "Whirlwind Centrifugal Selector," designed for handling a circulating load of 400 bbls. (80 tons) per hour and delivering a product from as coarse as 60 mesh or as



New "selector" made in large sizes for use with large mills

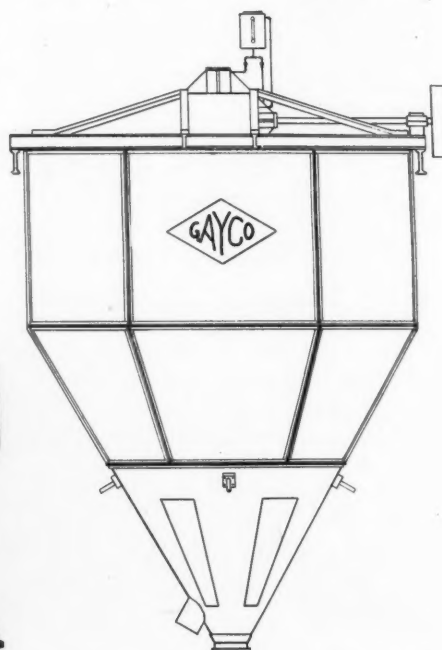
fine as 350 mesh, covering all requirements of the largest mills manufactured.

The makers say, in describing it:

"While the 'Selector' is built on the same general principles as the smaller separators, so successfully used, yet it incorporates many refinements and necessities for these huge demands. Its construction must be such as to hold many tons of cement in its cones should a stoppage occur; its feed opening must be of sufficient size to easily take an almost unlimited capacity, its settling cone must be big enough to collect and steep enough to discharge completely; its valves or vanes must be free and unhampered by the building up of cement which otherwise closes these openings and affects the fineness of its output. Its lubrication must be simple yet ample, and economical.

The fan must be balanced and vibrationless, and the power low, by the use of anti-friction bearings throughout. All these features have been studied and incorporated in the new Sturtevant."

The Rubert M. Gay Co. brought out its "Model 27" this year. This is an altogether new air separator, not only in size, but because of its design. It retains the "Gayco" principle of centrifugal sizing, but the new



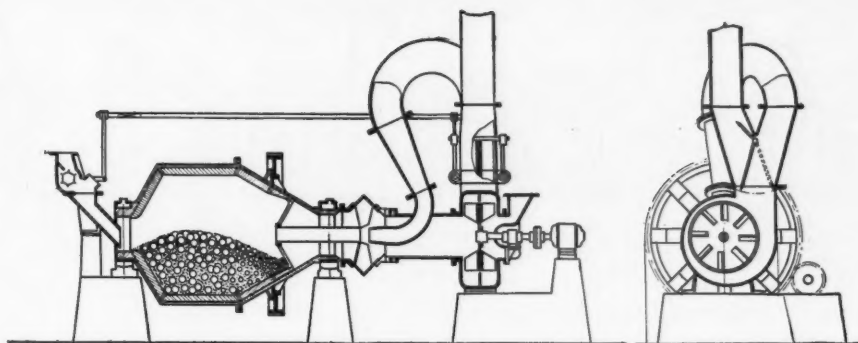
Exterior of separator with triple sizing action

model "has a triple sizing action, first a rough sizing by gravity at the distributor plate to remove the very coarse material, second a centrifugal sizing action in the separating chamber due to the fan rotation of the air and third a centrifugal action as the air passes through the fan path."

"This triple separation," according to the makers, gives "extremely sharp sizing, reduces the fines in the tailings, greatly increases the capacity and reduces the power per ton of finished material.

"The new centrifugal fan has step adjustments which give variations of less than 1/2% in the fineness of product and then are several hundred different steps covering the entire range from 60 mesh to 350 mesh and on to microscopic sizes. Adjustments can be made in two or three minutes and any adjustments can be returned to at any time with the assurance that the product will be the same as at a previous similar adjustment."

By the use of the principle of fan rotation of the air in the chamber it is claimed that there is practically no limit to the size of separators, and the new Model 27 is made in an 18-ft. diameter and might be made in a 20-ft. diameter. This allows



Combination of conical mill and air separator for coal grinding

it to be used with the very largest mills, such as are being introduced in present day rock products plants. The smaller size is 30 in. in diameter.

In the oiling system the pump has been eliminated, the oil being lifted by a fixed scoop projecting into an oil reservoir on the fan hub. There is nothing to wear out in this, and it is said to lubricate all the bearings very completely.

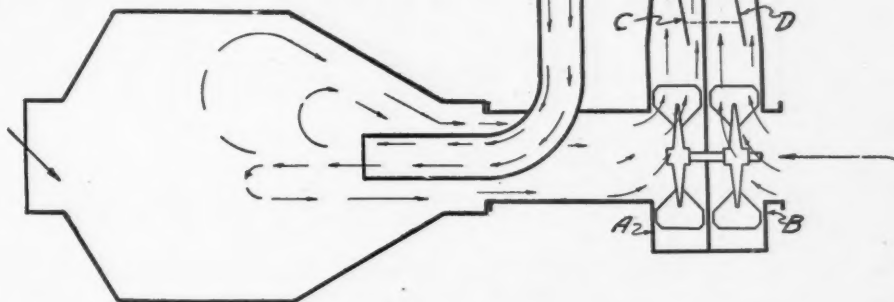
The Hardinge Co. has a unit coal pulverizer which is a combination of its conical mill and a simple air separating device. It is shown in the illustrations as line cuts sections and also in diagram form. Reference to the diagram will show how the device works. There are two fans in a suction chamber connected to the mill so that air and pulverized coal are drawn out. The fans discharge into a chamber which has a pipe going to the burner and two other pipes returning the to the mill. Vanes in the inlet of these pipes can be deflected so that any part of the fan discharge can be circulated while the remainder is sent to the burner. Thus the feed and the fineness of grinding are regulated. Make-up air is taken as needed from the outside by one of the fans.

High Temperature Insulation Booklet

THE Celite Co., Los Angeles, Calif., has brought out a booklet, "High Temperature Insulation," which contains much interesting data on the uses and types of materials for insulating equipment. One of the chapters is devoted to vertical lime kiln insulation, Celite having been used for insulating the vertical kilns at the Farnam-Cheshire Lime Co., Farnam, Mass., for a number of years.

Welding Flame Must Always Be Neutral

IT is second nature for most welders to adjust the welding flame properly at neutral before beginning a welding job. You will always see the operator, whether he is working on light welding, heavy welding, or on cutting, snap an acetylene flame with his spark lighter, adjust the blowpipe valves to give an excess acetylene flame, then, holding the blowpipe head where he can see



The vanes C and D may be set to circulate all or part of the load or to send all or a part to the burner

it clearly, reduce the acetylene until the excess acetylene flame just disappears, leaving the inner cone clear and sharp.

This is, of course, just what he should do. The neutral flame is used for all welding except for some very special work on copper, Stellite, and one or two other metals. It is used because it has no marked effect on the molten metal in the weld, as a flame with an excess of oxygen will have. It gives a higher flame temperature than either an excess acetylene flame or an excess oxygen flame. Besides, it is more economical to use.

Still, when he once regulates the flame properly to neutral, the welding operator cannot take it for granted that there will be no variation in the flame adjustment as the work proceeds.

Changes may occur from a number of perfectly natural causes, even with the best of blowpipes and regulators. And where regulators are old or in need of minor repairs, it may be necessary to adjust the flame frequently.

It will require but a moment for the operator to take the blowpipe off the weld, hold it up in a convenient position and check the flame with his eye. If the feathery edged excess acetylene flame, or the shortened, necked-in excess oxygen flame is noticed, it is a matter of a few seconds to change the adjustment. In readjusting an oxidizing flame to neutral, after having glanced at the oxygen gauge to see that the pressure is right, it is best first to increase the acetylene until the excess acetylene cone shows, and then reduce the acetylene until the cone just disappears. In fact, adjustment to neutral should always be made from the excess acetylene side, because it is easy

to see the exact instant when the excess acetylene cone vanishes.

If the flame is neutral, nothing has been lost except a few seconds' time. If it is not neutral, the chances are that by properly

adjusting it immediately, the operator will save something is oxygen or acetylene, will increase the speed of his work, and will go far towards assuring a good, strong weld.—*Oxy-Acetylene Tips.*

Chemical Engineering Catalog

CHEMICAL ENGINEERING CATALOG. 12th Annual Edition, 1927. The Chemical Catalog Co., Inc., New York. 1160 pp. Price—Gratis or \$1 per copy to special classes of industrial men and \$10 to all others.

THE new edition of the Chemical Engineering Catalog is more complete than any of the other preceding it and, as ever, a most valuable and convenient information source for the chemist, chemical engineer or others engaged in chemical industry. The data presented on equipment and its uses have increased and are more detailed. On the other hand, the manufacturers' statements are presented in brief, concise manner, carefully indexed—so that the reader can easily and quickly find desired facts without a time-consuming perusal through a large number of individual catalogs many of which do not even contain what he is looking for. The technical book section is well taken care of, the list of reference volumes printed in English making a valuable compilation for the chemist.

The general features of previous editions have been kept in this one and are best so, for the style has already become quite familiar to users. Many new industrial chemicals are listed as being regular articles of manufacture. These, like other reference data, are all carefully classified under one or several headings. The new edition should be on every chemical engineer's desk, for there is no single book which divulges the compiled information so easily.

Cement Products

TRADE MARK REGISTERED WITH U. S. PATENT OFFICE

Cement Products Completes Another Great Year in 1927

All Classes Advance Despite the Shrinkage in the General Building Market

THE present season in the cement products field opened up rather pessimistically and is closing as another record-breaker. Concrete block, brick and tile demonstrated their ability to retain their previous lead in spite of a small shrinkage in the general building market, light weight clay aggregates were definitely introduced, farm demands ex-

quirements. This seems evident from the volume of inquiries for modern machinery now being received. Hopeful signs of the times are the shorter time paper being given in the purchase of equipment, decreased bank borrowings, decrease in finished stocks and increase in selling effort. While building permits, which may be taken as a good indicator of the market for building products, are off considerably in some centers, concrete block orders have not dropped correspondingly, apparently showing an ability to displace a greater proportion of competing material as the necessity arises.

Concrete Masonry

Concrete building tile have staged a mighty "come back" during the last few months, particularly along the West Coast and in the Southeast. Nearly one million of these units have recently gone into school

house construction in the city of Los Angeles alone, while hundreds of thousands have recently gone into factory and store buildings in that vicinity. The record throughout the Southeast is similarly refreshing and shows that this unit has just begun to find its stride in modern fireproof building construction.

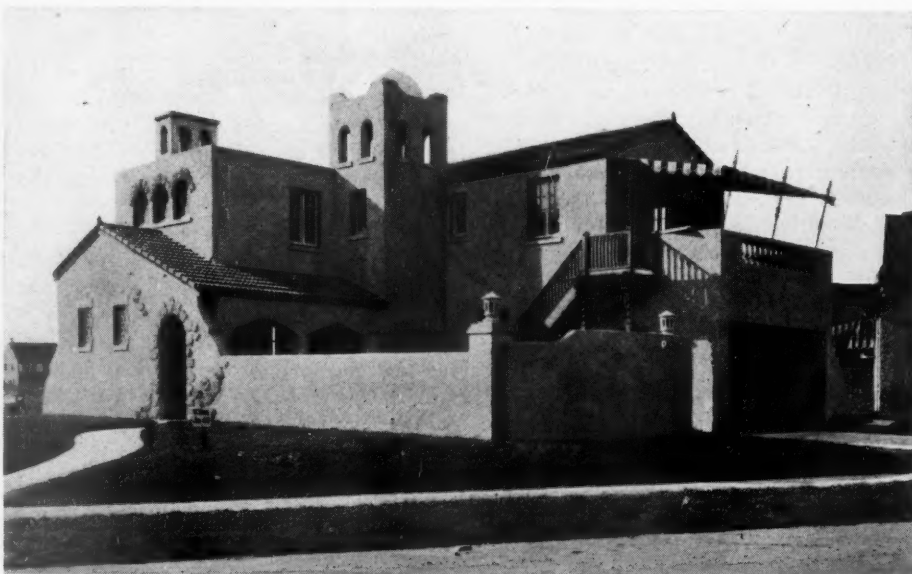
At last a definite demand has appeared for a really fireproof house, with floors, stairs and partitions as well as the walls and roof, of non-burning construction. This trend is the logical outcome of the use of fireproof concrete construction for hotels, clubs, churches and apartments. No one familiar with the security and other advantages of real fireproof construction would now willingly be without it. Several hundred houses in the moderate price field have recently been completed in the East and a plan service to meet the needs for completely fire



Demonstration concrete masonry house recently completed by the Cincinnati Concrete Products Co.

ceeded any year for a decade and concrete sewer pipe made almost a clean sweep in the various territories where it is established.

Cement products manufacturers purchased a record quantity of new manufacturing equipment in 1927, as a natural result of the general prosperity apparent throughout the industry, and the quantities ordered probably took care of delayed and normal replacements rather than contemplated re-



Advanced ideas of construction and beauty in the demonstration house at Cincinnati, Ohio



New surface finish—white cold water paint over concrete block

resisting houses will be forthcoming soon through the efforts of the Portland Cement Association.

Valuable in introducing the new type of entirely fire-resistive houses have been the three splendid demonstration houses recently opened in St. Paul, Cincinnati and New Orleans through the co-operation of the Portland Cement Association with local concrete products manufacturers. Because of their completeness and advanced ideas concerning what constitutes good construction, convenient layout and firesafety these proved the most popular demonstration houses shown anywhere during the year.

Light Weight Aggregates

The use of light weight aggregates continues to gain in favor among products manufacturers, undoubtedly because of greater adaptability and a growing public preference for the lighter units. The Na-



Concrete pillars and balustrade

tional Building Units Corporation, the largest manufacturer of cinder concrete block, report a banner year. The Cincrete Products Co., manufacturers of cinder concrete block in Milwaukee report a large increase in business and an extremely bright outlook. The validity of the Straub patents covering cinder aggregate units is still in doubt and no far-reaching decision may be expected for several months at least.

Haydite, burnt clay aggregate, for concrete



Close-up of the side wall and chimney

block and tile seems to be rapidly coming to the fore, the output during the past year having been increased several hundred per cent. Haydite aggregate block of standard 8x8x16-in. size weigh around 32 lb. on the average against 37 lb. for cinder aggregate block and 57 lb. for ordinary gravel aggregate block. The advantage of this lightness more than compensates for the greater cost of the aggregate for certain purposes. The Haydite aggregate unit is made in the standard load-bearing strengths and possesses



Concrete masonry house at Johnson City, Tenn., during construction and after completion

easy cutability; nailability, while probably not equal to that of the cinder aggregate, is satisfactorily nevertheless.

Another light-weight clay aggregate which has developed interesting possibilities is known as "Sinter," produced by a roasting process. The production of light weight aggregates of these various types on a commercial scale is now in its infancy, but undoubtedly offers great possibilities. In addition to their use in precast concrete products, they have an unquestioned field in general concrete construction, particularly for inside partitions. During the present year a number of leading clay products manufacturers have entered the light weight aggregate field and inquiries indicate that others are contemplating similar action. Thus is progress and development bringing two highly competitive industries into mu-

tually profitable business relationship.

Insurance Situation Better

Further fire tests at the Underwriters' Laboratories, Chicago, during recent months further emphasize the ability of concrete masonry of various designs and aggregates to cope with every reasonable fire hazard. Tests on 8-in. and 12-in. walls of the "Stone-tile" type, standard aggregate unit produced results at least as favorable as those obtained in any similar test to date. Panel tests on burnt clay aggregate units recently completed but not yet officially reported, may be looked forward to with entire confidence.

As a result of the satisfactory performance of concrete masonry in these and earlier laboratory tests and the absence of a contrary actual fire record during several



A beautiful example of light buff cut cast stone, used in a business building

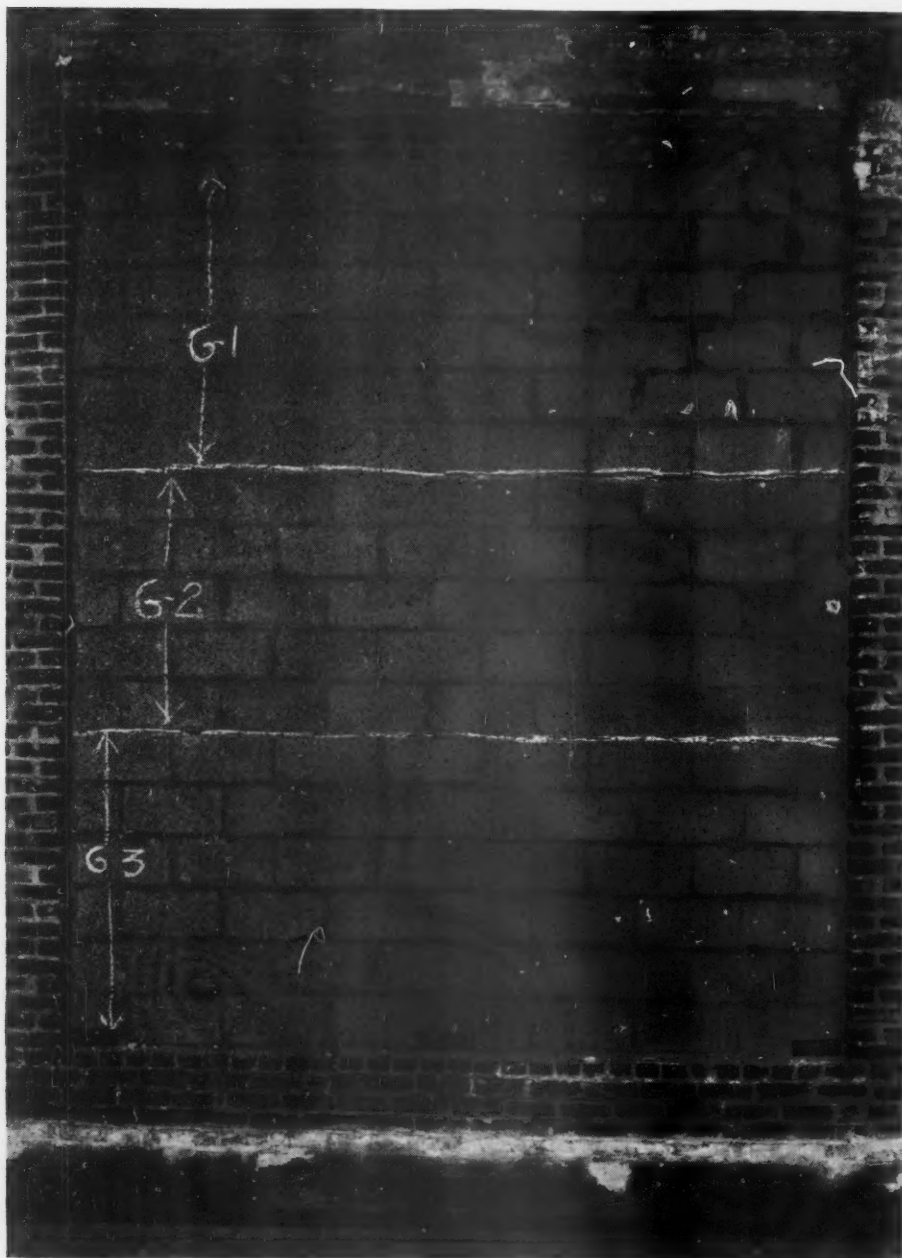
years past, the fire insurance rating bureaus are gradually granting more favorable rates on concrete masonry buildings. During 1927 rating bureaus in 18 additional states granted concrete masonry the same rating as solid brick in residence construction, making a total of 34 states where these rates, the best to be had, are now in effect.

Considerable prejudice still remains in the rating organizations against concrete building tile, due to the relatively narrow web thicknesses and their similarity in shape to clay tile, which in the past has had none too good a fire record. The actual fire experience with concrete tile is such, however, that there is among manufacturers and users great confidence in its ability to perform; and is not unlikely that panel fire tests will be arranged at the Underwriters' Laboratories during the coming year.

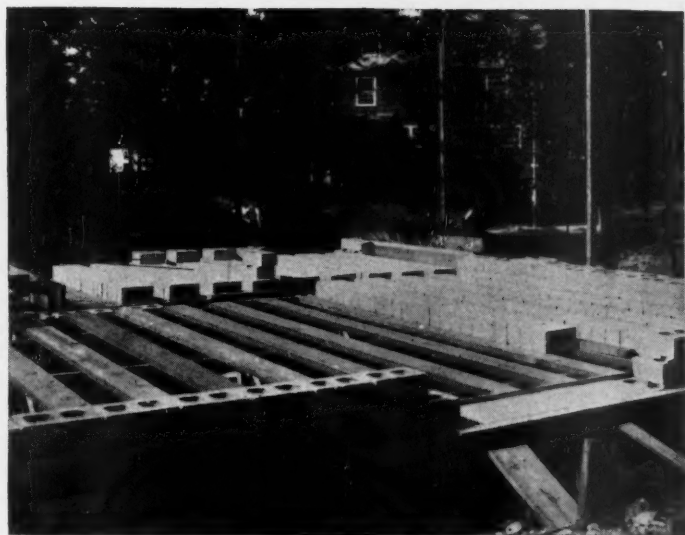
Steady Progress by Cast Stone

The larger cast stone manufacturers, located in the East and Central West, report a favorable year. The concerns specializing in cut cast stone of the highest quality seem to be making the most significant gains in tonnage. They have shown astonishing ability in securing recognition of the leading architects for work of the highest character. In this respect the manufacturers of high grade cast stone are contributing materially to the prestige of concrete as a structural surfacing material.

During the year the Benedict Stone Cor-



Panel of concrete blocks exposed to five hours of intense fire at Underwriters' Laboratory. Tests of this kind are proving the superiority of concrete masonry over clay brick



Modern concrete floor construction using concrete tile fillers



The concrete floor after completion

poration absorbed the Linthicum Stone Co. of Baltimore, giving the Benedict organization four of the five largest cast stone plants in the country, at New York, Montreal, Baltimore and Chicago. This company's product was chosen for the lower surfacing of the forty-story Bankers Trust Building in Chicago, the \$200,000 Buckingham fountain and monumental decorative bridges and balustrades now under construction in Grant Park, Chicago. In New York this company's product was used on several outstanding jobs of the year—one of them a magnificent new theatre at 57th Street and Broadway. During the past few months the Onondaga Litholite Co., of Syracuse, N. Y., completed half a dozen noteworthy jobs in New York and Pennsylvania cities while the Havlik Stone Co., of Chicago, has attracted attention particularly through its work on two modern apartment hotels of large size.

Space will not permit a recital of the notable cast stone work of the year. In volume it is greater than for 1926 and in character even more encouraging. However, notwithstanding the apparent success in attracting business, the cast stone field is obviously oversupplied in many localities,

the volume of business per plant and the prices received only occasionally making the operations remunerative to a satisfactory degree. This situation is so serious that it has already led to the closing of the cast stone departments of several concrete products companies. The same predicament is evidently faced by many producers of natural dimension stone and evidences of it are also seen in the terra cotta trade.

Portland Cement Stucco

Cheap and indifferently executed stucco work with the variety of stucco preparations by which the building public has been exploited during recent years may be held largely responsible for a pronounced tendency in many localities toward the use of face brick. During the past year, however, portland cement stucco has been decidedly in the ascendency. Not only do present specifications for the portland cement product guarantee proper quality and construction recommendations assure satisfactory work, but the strides made in the use of color and in the application of fine textures place cement stucco construction on an entirely new and unquestionably on a more stable basis.

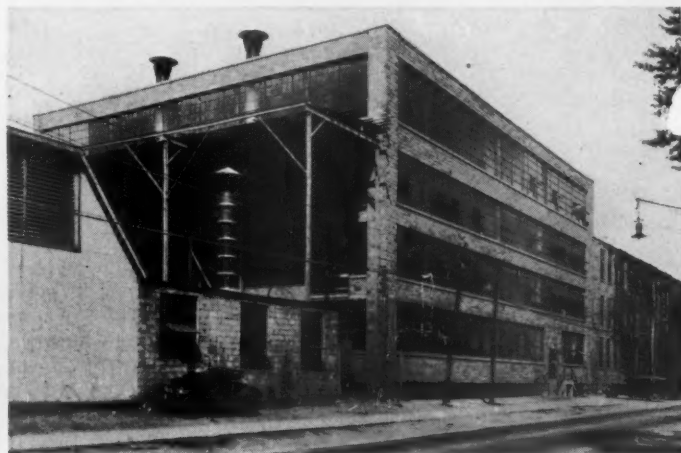
A number of ready-mixed portland cement stuccos have appeared during recent months for use as the final coat, offering the benefits of color uniformity which is sometimes difficult to obtain when successive small batches are mixed on the job. These stuccos are now obtainable almost everywhere and are already being depended upon by stucco contractors.

Perhaps the greatest factors of the year so far as stucco products are concerned were the plasterer's demonstrations or schools held in various localities by the Portland Cement Association. These meetings were held in 70 cities in 29 states reaching over 5000 plasterers. Trained plasterers especially skilled in exterior application were in charge of this work. Their reception everywhere was enthusiastic, the plasterers and plaster contractors being quick to grasp the opportunities for selling the public on better and finer looking stucco.

The ultimate in fine stucco finishes would appear to be still left for the future, so rapid and continual is present progress. The introduction of more extensive template work and more elaborate hand tooling, of fine aggregate sizing and color matching



Modern barn and dairy house of concrete block



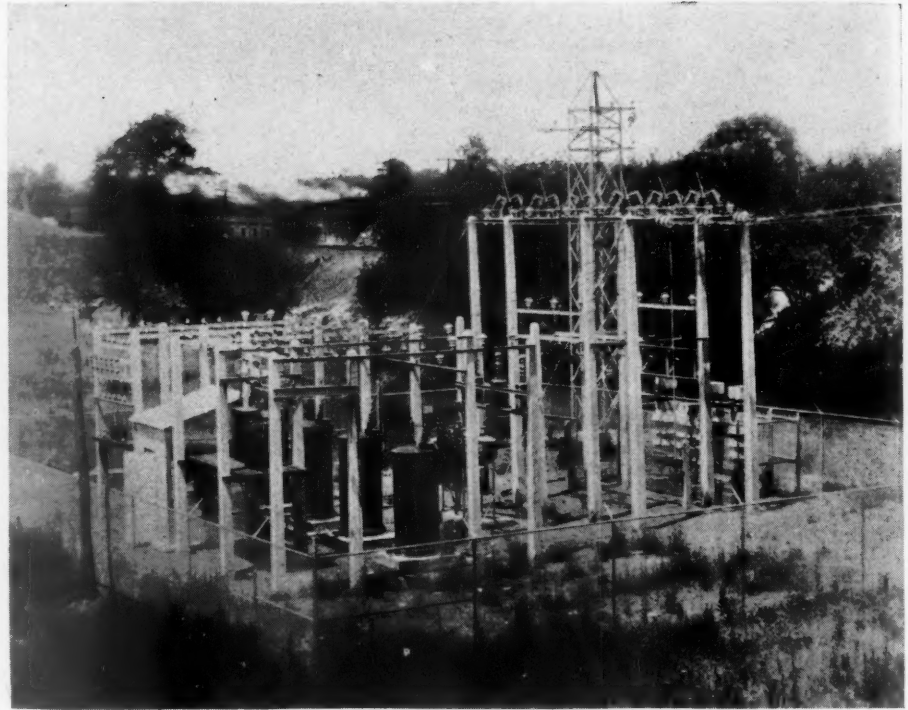
Recent type of concrete masonry factory and office building

gives promise of even more exquisite effects as highly skilled workers are developed in greater numbers.

Precast Terrazzo or Art Marble

Precast concrete floor slabs, wainscoting and interior trim made encouraging headway during the past year, particularly in the central part of the country. Chicago again led with a production estimated at nearly half that produced in the United States. The Chicago product is shipped quite extensively for a thousand miles or more in all directions, finding ready market in banks, hotels, office buildings and schools of the better class of construction as well as in stores. Practically all of Chicago's several new hotels and clubs have made extensive use of this product. All new public schools in Chicago have it specified exclusively. One of the new Chicago bank buildings is having the entire interior surfaced with the product of the Chicago Art Marble Co., much of the tracery in the decorative pedestals and partitions being so fine that it is being done by expert sculptors using dental drills.

While the quantity of concrete used in precast terrazzo work is not relatively large the excellent character of this product and the high reputation it is acquiring among architects and owners, is earning great prestige for concrete products of all kinds. The finest natural marbles, such as Botti-



Concrete poles used for outdoor electric station at Rochester, N. Y.

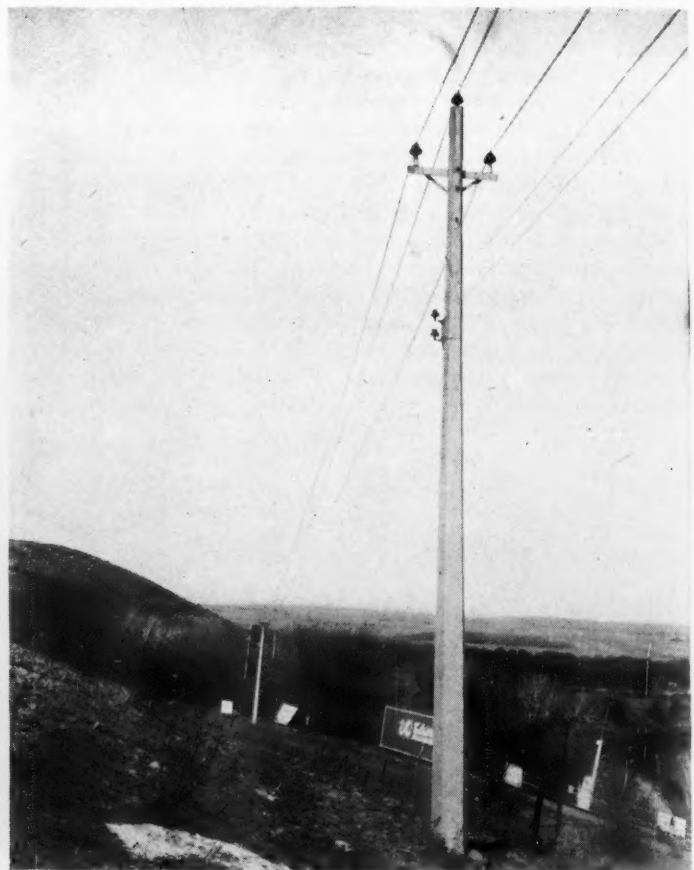
cino from Italy and Black from Belgium as well as the Tennessees, Verona, Pennsylvania, Greens, Champlain and Tuckahoe white, are now being extensively employed in mixtures with tested mineral pigment

mortars. A shipload of Botticino chips was recently imported by one of the large Chicago companies for this use.

The farm building field has always been alluring so far as concrete block and con-



Lighting standards of this type, 400 of them, were just erected in Oak Park, Ill.



Concrete poles for high power tension lines installed in Alabama



Interior of a modern concrete lighting standards plant



Type of lighting standard recently erected in Milwaukee

crete brick are concerned because of a large proportion of the manufacturers located on the edge of the smaller cities and in rural neighborhoods. Consequently the return of the farmer as a customer for building mate-

is relatively more limited than for years past, and with the better prices for farm products there will probably develop a stronger demand for new barns and extensions.

Lighting Standards and Poles

Concrete lighting standards continue to enjoy increasing popularity. Few if any new manufacturers of importance entered the field during the year although practically all of the larger concerns have expanded considerably. The largest new plant is probably the St. Louis shop of the Westinghouse Electric and Manufacturing Co. Concrete standards are now used almost to the exclusion of all other types in southern California cities and in Florida. Many miles of these posts were recently erected in Seattle; Chicago's new lighting is almost entirely on concrete standards and a dozen suburbs of the city have placed nearly 10,000 of these standards this year. Many eastern centers are also following the same trend.

The introduction of a number of new and more graceful designs and the employment of advanced methods of designing mixtures and curing concrete are among the marks of progress during the year. Several installations have been completed recently in which pink or buff pigment has been used to produce colors blending artistically with the surroundings.

Concrete Pipe

Marked progress has been made in extending the markets for plain and reinforced concrete sewer pipe. This field, which has been hindered for some time by too many manufacturers who were unwilling to take the matter of quality seriously, has finally begun to come into its own. Periodical inspection of plants and rigid insistence by the American Concrete Pipe Association on highest quality standards during the past few years have served to

convince public officials of the superiority of concrete.

The estimated output of concrete sewer pipe during 1927 is twice that for 1925 and showed a 35% increase over 1926. A number of the cities which showed greatest progress in the use of concrete pipe in 1926 led again in 1927. Over 30 miles of sewer of this type was laid in Detroit as a direct result of the long battle which ended in admitting concrete pipe to the city specifications for both storm and sanitary sewers. Several of the Texas cities, notably Fort Worth and San Antonio used large quantities as did Miami and other southern Florida cities. One of the most spectacular uses was in the Chicago suburban districts, where the excellence of earlier installations has led to a decided preference. As the year closes many miles of large concrete pipe are being laid to drain the low lands



More than 30 miles of this pipe were laid in the vicinity of Detroit in 1927

rial has had good effect on the concrete block market in many localities this year and presents bright opportunities for the immediate future. The determined selling campaigns of the household utilities, electric appliance and radio manufacturers seems to have had the effect of focusing the farmer's attention on his home, and we may expect a market for many thousand block in new farm dwellings and repairs. Barn capacity



All leading manufacturers of concrete sewer pipe subject the product to tests of this kind

to the north, west and south of the city, where extensive subdividing is under way.

Railroads Continue Extensive Use

Precast slab construction is being employed more extensively than in the past for railway grade elimination. Concrete pipe culvert construction remains in strong favor. Precast bases for switch stands and

there is a growing market for *quality* cement products. In every contributory rock products industry in 1927 there has been an outstanding demand for, and a strenuous effort to meet, higher standards for quality—cleaner, better graded aggregates, higher strength cement, more scientific proportioning and mixing, more and better sales service, all along the line. It follows that the

years; in 1926 there were 146 new companies incorporated for \$17,050,000 and in 1925, 157 companies for \$11,487,000, the same statistical sources furnishing the data.

The manufacture of cement products has changed in the last four years. The apparent trend is away from the small irresponsible plant and the business fast becoming



Precast concrete slabs in a slab yard at Chicago. These slabs are to be used in track elevation work

interlocking equipment has become almost standard on first class railroads, being installed in large quantities. Reinforced-concrete trestles, consisting of precast piles and slabs with crowns cast in place, were constructed very extensively during the year. An excellent treatise on this growing use

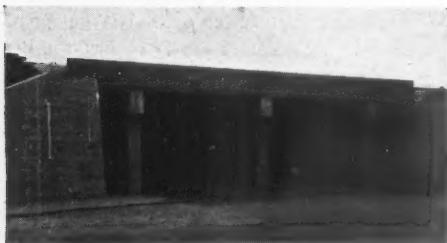
day of one-horse-power operation is rapidly passing. The cement products producer of the present and future is the one who has brains, one who knows quality products when he sees them—both quality products of his own manufacture and quality ingredients that go to make his product.

a stable manufacturing industry. The responsible companies are continually expanding and spending sums along research lines for improvement of their products and processes. Some of the expansion is in the regular products, such as standard block and tile, and considerable in the addition of new lines as cement sewer pipe, concrete building units and in agricultural centers, silo staves and septic tanks. Many aggregate producers are finding it profitable to add a products plant as a sideline and in some instances this sideline has become the important end of the enterprise.

Prices on nearly all classes of products were lower in 1927, an average decrease for the entire country of about 10% as compared with 1926 prices, being a fair estimate. Gross value of products probably increased over 1927, many producers showing increased volume to offset the lower prices.

From Readers' Reports

TABULATION of the incorporation notices published regularly in *Rock Products* shows 128 new companies formed during 1927 to manufacture cement products. The list is incomplete, inasmuch as only chartered companies are taken into account and there must have been many sole ownership or partnership enterprises formed during the year. Total capitalization is represented \$10,878,250, the lowest in the last three



Reinforced concrete slabs on concrete piers and abutments

was recently issued by the Portland Cement Association.

Perhaps the most interesting railroad use of concrete products during the year, at least from the viewpoint of future possibilities, was the manufacture of 25,000 reinforced concrete ties by the Pennsylvania. This work, which was done at the Aspinwall shops, near Pittsburgh, includes the largest number of ties ever cast by any railroad. Some 8,000 concrete ties will be installed on the Monongahela division of the main line east of Pittsburgh and the remainder will be placed elsewhere in smaller groups. It is expected that all of these ties will be kept under close observation for several months with a view to improving design, if possible, before embarking on an extensive program of concrete tie installation.

Conclusions

The foregoing summary makes clear that



Reinforced concrete railroad ties in a section of roadbed at Aspinwall, Penn., after nine months of service

Some producers effected economies in manufacture which permitted sales at lower prices and expect to produce at even lower costs in 1928.

Business in the east was generally satisfactory, the Philadelphia district showing decided increases in the use of block for residential buildings. Florida has been hard hit by a building slump but producers believe the period of readjustment to be about over and are optimistic over the future. The Middle West, particularly in the agricultural states, is developing rapidly into a large user of cement products. The Chicago district shows gains, chiefly in sewer pipe, building ordinances limiting the use of block for structural purposes. Large amounts of cut cast stone are used for building trim and this item appears to have a good future, particularly in the large cities. The market in the Pacific Coast states was satisfactory, although prices were off.

Good Year Expected in 1928

The future of the products industry appears to be bright, new uses constantly springing up. There is apparently no limit to the extension of concrete for the farm; the last year has seen more silo staves, septic tanks, pressure tanks produced and sold than ever before. Other lines are also increasing and 1928 should be a banner year, provided, of course, business continues its normal course. Raw materials cost, including labor, will probably be the same in 1928 as in 1927, but the cost of finished products a little lower, owing to increased efficiency in manufacture.

How a Minnesota Products Manufacturer Increased Sales

EVERY manufacturer is interested in increasing sales and the Concrete Products Association has distributed some interesting literature on advertising, sales talk and other things. But it remains for one manufacturer in Minnesota to present what in our opinion is the "quality" idea. First, he starts with a quality block, something which he knows is good and is proud of. The rest of his method of increasing sales follows in his own words:

"My experience is this. In 1922, when I started my plant, I had to educate the people in the use of cast stone construction. The first two years were mostly spent by myself in advertising and showing the people that I was making a quality block—an everlasting building material. I advertised through the papers and by talking, but my best advertising I got by having a display at the different county fairs where you reach the right people and have a chance to talk to them and get new prospects.

"The last four years I have furnished granite faced cast stone blocks and trim

stone (in different colors) for 31 complete dwellings and I don't know how many filling stations and garages and other buildings. I make it part of my business to get my customers good masons, men who take pride in their work, and also make it my duty to make several trips to every job to see that they are built to stay. In doing this, I am sure of getting good footings, good workmanship and satisfied customers. I have yet to find any job I have furnished to have a cracked block in it. Every customer appreciates your coming out to help them, and is a booster for your business."

Contracts Let for New Plant of Volunteer Portland

THE new mill of the Volunteer Portland Cement Co. which is being erected six miles east of Knoxville, Tenn., is rapidly nearing completion. At the present rate of construction the plant should be in production by the first of April, provided good weather prevails. Practically all of the foundations are completed and some of the machinery is now being installed. The two 215-ft. kilns are already on the ground, and the two stacks, 175 ft. high, are completed. The main buildings are now being erected. Major I. H. Lewis is the engineer in charge of the construction.

Contracts have been let for most of the machinery and equipment for the new plant. Allis-Chalmers will furnish the 36-in. gyratory crusher and the Bucyrus Co. the Diesel engine dragline and electric shovel. Other contracts include the following: Dravo-Doyle Co., Philadelphia, water pumps; Easton Car and Construction Co., steel quarry cars; Fuller Co., conveying system; Fuller-Lehigh Co., coal drying, pulverizing and transport equipment; General Electric Co., motor switches, transformers and other electrical equipment; Ingersoll-Rand Co., air compressors; Pennsylvania Crusher Co., two hammer mills and feeds; F. L. Smidth & Co., four Unidan mills and slurry basin equipment; Schaeffer Poidometer Co., eight poidometers; Traylor Co., two rotary coolers; Vulcan Iron Works, rotary kilns; Whitcomb Co., locomotive; Milwaukee Electric Crane and Manufacturing Co., bridge crane; Northern Blower Co., dust collecting material; Wilfley and Sons, slurry pumps; American Miag Corp., torpedo conveyors and clinker cooler equipment. The Burrell Engineering and Construction Co. was awarded contracts for the two 175-ft. stacks, bin stock house, slurry basins and 4-story packing house. Excavation and railroad track construction was let to the Dempster Construction Co. of Knoxville, and McMurry Construction Co., also of Knoxville has the building and machinery foundations. A. R. McMurry and Co. of Louisville will erect the laboratory, garage and clinker storage and will furnish concrete for other buildings.

Olympic Portland to Make Quick-Hardening Cement

ANOTHER firm to enter the field of manufacture of quick-hardening cement is the Olympic Portland Cement Co. of Seattle, Wash. A recent announcement from the company states that the new cement, which will be manufactured at the company's mill at Bellingham, Wash., will be marketed under the registered name of "Velo." The process used will be that developed by F. L. Smidth & Co., engineers, of New York City. Extensive tests have been made on the new cement, which has already been turned out by the Olympic company, and have been entirely satisfactory. It is expected that quantity production will be carried on shortly.—*Bellingham (Wash.) Morning Herald.*

Crushed Stone Convention Will Entertain Ladies Also

IN connection with eleventh annual convention of the National Crushed Stone Association at West Baden, Ind., on January 16 to 19, there is being arranged an unusually attractive program for the wives and daughters of the delegates. Mrs. Grace W. Evans, Lafayette, Ind., is in charge of the entertainment for the ladies, and it is certain that the arrangements she is making will be all that could be desired. The convention committee is making a special effort to have as many members as are able to bring their wives with them and make it a real family party. Every member is urged to let Mrs. Evans know how many ladies there will be in his party, so that the committee can plan the entertainment more easily, and with better assurance that it will be as desired. With these arrangements there need be no fear that there will be any dull times for the wives while the men are in the convention meetings.

"Sandy Sam" Says It Will Be a Big Time

"SANDY SAM" says there is sure going to be a big time at the National Sand and Gravel Association convention in Detroit, January 4-6. He reckons we-all had better plan to be there, and he's written to us telling what we can expect when we step into the Book-Cadillac Hotel—but he has written the announcement so that 99% of us will read it, and that is more than most of us do for the usual convention announcement. "Sandy Sam" in real life is a group of Detroit sand and gravel boosters, and "Sandy Sam's Jassiteer" is a luridly-colored publication sent out every "once in a while" by this group, telling sand and gravel men about the big convention. We received a copy, which we think is mighty interesting. And we hope you did, and you do, also.

Portland Cement Output in November

Production and Shipments Follow Seasonal Trend
but Are Above the Figures for November, 1926

THE portland cement industry in November, 1927, produced 14,449,000 bbl., shipped 11,619,000 bbl. from the mills, and had in stock at the mills at the end of the month 13,971,000 bbl., according to the United States Bureau of Mines, Department of Commerce. The usual seasonal trend was shown by decreases in production and shipments and increases in stock as compared with October. Production and shipments were, however, slightly greater in November, 1927, than in November, 1926, and stocks slightly smaller than a year ago.

These statistics are compiled from reports for November from all manufacturing plants except two, for which estimates have been included in lieu of actual returns.

In the statement (on next page) of relation of production to capacity, the total output of finished cement is compared with the estimated capacity of 154 plants at the close of November, 1927, and of 141 plants at the close of November, 1926.

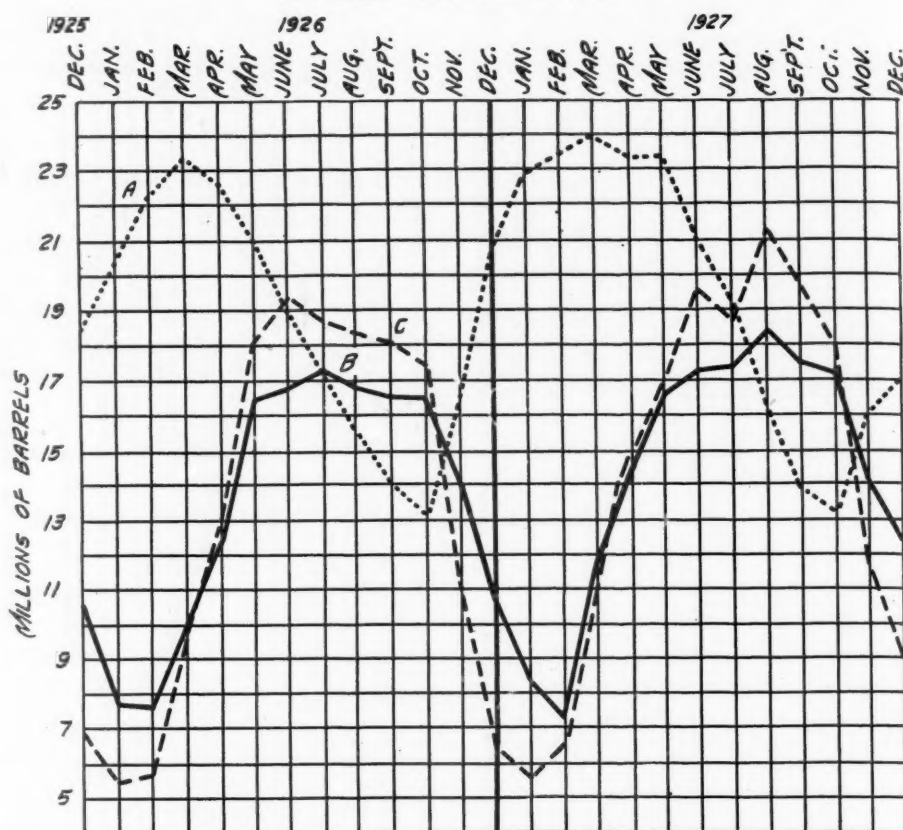
Stocks of clinker, or unground cement, at the mills at the end of November, 1927, amounted to about 6,380,000 bbl., compared with 5,957,000 bbl. (revised) at the beginning of the month.

ESTIMATED CLINKER (UNGROUND CEMENT) AT THE MILLS AT END OF EACH MONTH, 1926 AND 1927

Month	1926	1927
January	9,074,000	9,989,000
February	10,931,000	11,943,000
March	12,290,000	12,997,000
April	12,967,000	13,335,000
May	11,695,000	12,514,000
June	10,144,000	10,926,000
July	8,604,000	9,609,000
August	7,362,000	7,887,000
September	6,112,000	6,490,000
October	5,370,000	*5,957,000
November	5,748,000	6,380,000
December	7,799,000	

*Revised.

MONTHLY FLUCTUATION IN PRODUCTION, SHIPMENTS AND STOCKS OF FINISHED PORTLAND CEMENT



(a) Stocks of finished portland cement at factories; (b) Production of finished portland cement; (c) Shipments of finished portland cement from factories

Distribution of Cement

The following figures show shipments among the states to which cement was shipped during September and October, 1926 and 1927:

PORTLAND CEMENT SHIPPED FROM MILLS INTO STATES, IN SEPTEMBER AND OCTOBER, 1926 AND 1927, IN BARRELS*

Shipped to—	1926—Sept.—1927	1926—Oct.—1927	Shipped to—	1926—Sept.—1927	1926—Oct.—1927				
Alabama	153,636	229,592	169,086	268,221	New York	2,490,511	2,703,962	2,107,119	2,119,748
Alaska	668	742	132	0	North Carolina	412,719	303,283	382,736	302,904
Arizona	42,709	38,589	44,360	40,461	North Dakota	46,528	35,938	30,647	27,700
Arkansas	75,962	87,996	70,785	92,180	Ohio	1,137,722	1,406,311	989,005	1,284,751
California	1,204,615	1,114,333	1,276,210	1,170,744	Oklahoma	219,399	329,676	188,144	301,163
Colorado	137,054	107,896	113,951	120,300	Oregon	150,679	127,909	126,946	122,443
Connecticut	255,785	257,188	242,167	214,120	Pennsylvania	1,620,018	1,683,405	1,415,233	1,413,406
Delaware	46,600	58,667	44,898	34,107	Porto Rico	0	0	0	500
District of Columbia	94,183	100,626	90,347	97,408	Rhode Island	56,575	76,597	72,653	71,567
Florida	315,214	152,129	343,404	153,713	South Carolina	55,967	100,262	61,636	112,445
Georgia	160,377	149,740	148,699	153,271	South Dakota	47,794	56,882	48,761	57,753
Hawaii	17,179	11,790	16,887	23,201	Tennessee	239,051	253,945	203,406	231,850
Idaho	34,221	29,588	33,444	32,774	Texas	430,727	449,994	441,775	523,015
Illinois	1,458,052	1,902,780	1,918,899	1,892,207	Utah	56,948	43,021	64,504	41,022
Indiana	646,062	807,523	719,882	701,944	Vermont	50,697	71,529	34,591	52,392
Iowa	350,251	563,779	501,683	527,340	Virginia	191,720	197,320	151,319	181,685
Kansas	226,069	261,769	244,497	305,427	Washington	202,117	264,748	191,453	220,784
Kentucky	246,310	245,577	192,177	223,764	West Virginia	188,894	250,542	143,112	205,074
Louisiana	108,642	129,457	123,139	131,902	Wisconsin	594,999	711,004	582,919	541,528
Maine	90,934	63,493	47,136	49,167	Wyoming	23,893	19,223	15,475	15,102
Maryland	249,489	285,248	270,241	258,427	Unspecified	73,748	38,980	13,132	1,954
Massachusetts	358,853	310,562	305,190	302,248					
Michigan	1,372,831	1,459,078	1,159,596	1,270,331					
Minnesota	407,570	414,197	384,739	345,054					
Mississippi	79,924	92,276	68,149	105,002					
Missouri	457,632	489,155	498,449	502,478					
Montana	30,597	43,797	27,916	35,507					
Nebraska	169,159	195,109	173,552	207,301					
Nevada	10,291	4,845	7,955	5,381					
New Hampshire	56,092	66,537	44,983	53,052					
New Jersey	866,717	960,390	856,615	870,585					
New Mexico	17,738	23,103	22,127	29,552					

Shipped to—	1926—Sept.—1927	1926—Oct.—1927	Shipped to—	1926—Sept.—1927	1926—Oct.—1927
New York	2,490,511	2,703,962	New York	2,490,511	2,703,962
North Carolina	412,719	303,283	North Carolina	412,719	303,283
North Dakota	46,528	35,938	North Dakota	46,528	35,938
Ohio	1,137,722	1,406,311	Ohio	1,137,722	1,406,311
Oklahoma	219,399	329,676	Oklahoma	219,399	329,676
Oregon	150,679	127,909	Oregon	150,679	127,909
Pennsylvania	1,620,018	1,683,405	Pennsylvania	1,620,018	1,683,405
Porto Rico	0	0	Porto Rico	0	0
Rhode Island	56,575	76,597	Rhode Island	56,575	76,597
South Carolina	55,967	100,262	South Carolina	55,967	100,262
South Dakota	47,794	56,882	South Dakota	47,794	56,882
Tennessee	239,051	253,945	Tennessee	239,051	253,945
Texas	430,727	449,994	Texas	430,727	449,994
Utah	56,948	43,021	Utah	56,948	43,021
Vermont	50,697	71,529	Vermont	50,697	71,529
Virginia	191,720	197,320	Virginia	191,720	197,320
Washington	202,117	264,748	Washington	202,117	264,748
West Virginia	188,894	250,542	West Virginia	188,894	250,542
Wisconsin	594,999	711,004	Wisconsin	594,999	711,004
Wyoming	23,893	19,223	Wyoming	23,893	19,223
Unspecified	73,748	38,980	Unspecified	73,748	38,980

	18,032,122	19,782,082	17,425,861	18,045,955
Foreign countries	54,878	45,918	60,139	59,045

Total shipped from plants	18,087,000	19,828,000	17,486,000	18,105,000
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*Includes estimated distribution of shipments from three plants in September and October, 1927, and from five plants in September and October, 1926.

†Revised.

Foreign countries 18,032,122 19,782,082 17,425,861 18,045,955

Total shipped from plants 18,087,000 19,828,000 17,486,000 18,105,000

*Includes estimated distribution of shipments from three plants in September and October, 1927, and from five plants in September and October, 1926.

†Revised.

PRODUCTION, SHIPMENTS AND STOCKS OF FINISHED PORTLAND CEMENT, BY MONTHS, IN 1926 AND 1927

Month	1926—Production—1927		1926—Shipments—1927		Stocks at end of month	
	1926	1927	1926	1927	1926	1927
January	7,887,000	8,258,000	5,674,000	5,968,000	20,582,000	22,914,000
February	7,731,000	7,377,000	5,820,000	6,731,000	22,385,000	23,560,000
March	10,390,000	11,452,000	9,539,000	11,083,000	23,236,000	23,922,000
First quarter	26,008,000	27,087,000	21,033,000	23,782,000		
April	12,440,000	14,048,000	12,965,000	14,350,000	22,710,000	23,654,000
May	16,510,000	16,701,000	17,973,000	16,865,000	21,255,000	23,503,000
June	16,866,000	17,224,000	19,134,000	19,761,000	19,000,000	20,972,000
Second quarter	45,816,000	47,973,000	50,072,000	50,976,000		
July	17,134,000	17,408,000	18,812,000	18,984,000	17,301,000	19,397,000
August	16,995,000	18,315,000	18,583,000	21,411,000	15,718,000	16,292,000
September	16,571,000	17,505,000	18,087,000	19,828,000	14,188,000	13,996,000
Third quarter	50,700,000	53,228,000	55,482,000	60,223,000		
October	16,596,000	17,174,000	17,486,000	*18,105,000	13,334,000	*13,141,000
November	14,193,000	14,449,000	11,276,000	11,619,000	16,243,000	15,971,000
December	10,757,000	†11,000,000	6,432,000	†7,000,000	20,679,000	†21,000,000
Fourth quarter	41,546,000	†42,623,000	35,194,000	†36,724,000		
	164,070,000	†170,911,000	161,781,000	†171,705,000		

*Revised. †Estimated by Rock Products.

PRODUCTION, SHIPMENTS AND STOCKS OF FINISHED PORTLAND CEMENT, BY DISTRICTS, IN NOVEMBER 1926 AND 1927, AND STOCKS IN OCTOBER, 1927

	Production		Shipments		Stocks on hand at end of November		Stocks at end of Oct. 1927*
	1926	Nov.—1927	1926	Nov.—1927	1926	1927	Oct. 1927*
Commercial district							
East'n Penn., N. J. & Md.	3,617,000	3,345,000	3,356,000	3,008,000	2,697,000	3,726,000	3,389,000
New York	820,000	804,000	609,000	740,000	883,000	1,205,000	1,142,000
Ohio, W. Penn. & W. Va.	1,157,000	1,542,000	1,067,000	986,000	2,151,000	2,069,000	1,513,000
Michigan	1,227,000	1,181,000	781,000	757,000	1,486,000	1,501,000	1,077,000
Wis., Ill., Ind. & Ky.	1,930,000	1,909,000	1,143,000	1,284,000	2,084,000	1,510,000	885,000
Va., Tenn., Ala., Ga., Fla., and La.	1,290,000	1,452,000	1,233,000	1,326,000	1,124,000	1,304,000	1,178,000
E. Mo., Ia., Minn. & S. D.	1,310,000	1,411,000	602,000	677,000	2,317,000	1,724,000	990,000
W. Mo., Neb., Kan. & Okla.	821,000	883,000	739,000	830,000	1,538,000	1,266,000	1,213,000
Texas	402,000	525,000	427,000	543,000	381,000	252,000	270,000
Colorado, Mont. & Utah	200,000	176,000	142,000	175,000	454,000	315,000	313,000
California	1,154,000	1,048,000	972,000	1,103,000	662,000	770,000	825,000
Oregon and Washington	265,000	173,000	205,000	190,000	466,000	329,000	346,000
	14,193,000	14,449,000	11,276,000	11,619,000	16,243,000	15,971,000	13,141,000

*Revised. †Began producing September, 1927. ‡Began producing June, 1927, and shipping July, 1927.

Exports and Imports

EXPORTS OF HYDRAULIC CEMENT BY COUNTRIES IN OCTOBER, 1927

Exported to—	Barrels	Value
Canada	2,407	\$ 12,824
Central America	3,643	11,923
Cuba	6,576	17,687
Other West Indies	2,984	9,691
Mexico	4,146	13,386
South America	42,850	135,868
Other countries	5,033	29,289
Total	67,639	\$230,668

IMPORTS OF HYDRAULIC CEMENT BY COUNTRIES, AND BY DISTRICTS, IN OCTOBER, 1927

Imported from	District into which imported	Barrels	Value
	Florida	18,300	\$24,301
	Maine & N. H.	3,000	6,240
	Massachusetts	51,810	52,952
	New Orleans	6,003	6,447
	New York	5,984	7,485
	Oregon	3,000	4,002
Belgium	Philadelphia	31,361	45,601
	Porto Rico	5	10
	Rhode Island	17,961	24,794
	South Carolina	1,800	2,246
	Virginia	3,036	3,698
	Washington	3,731	5,266
Total		145,991	\$183,042

Canada	{ Maine & N. H.	1,247	\$2,756
	{ Saint Lawrence.....	500	940
Total		1,747	\$3,696

Denmark	Porto Rico.....	32,850	\$46,122
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Norway	{ Philadelphia 3,000	\$3,563
	{ South Carolina..... 36,198	\$82,268
Total		39,198 \$85,831

United K'd'm	New York.....	1,488	\$3,086
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DOMESTIC HYDRAULIC CEMENT SHIPPED TO ALASKA, HAWAII AND PORTO RICO, IN OCTOBER, 1927*

	Barrels	Value
Alaska	805	\$ 2,472
Hawaii	14,850	38,737
Porto Rico	3,157	7,720
Total	18,812	\$48,929

*Compiled from the records of the Bureau of Foreign and Domestic Commerce and subject to revision.

RELATION OF PRODUCTION TO CAPACITY

Period	Nov. 1927	Nov. 1926	Oct. 1927	Sept. 1927	Aug. 1927
	Pct.	Pct.	Pct.	Pct.	Pct.
The month	75.9	79.3	87.4	92.6	94.5
12 mo. ended—	73.7	76.9	73.6	72.3	74.0

Oklahoma Portland Will Sell Direct to Contractors

A NEW policy has been adopted by the Oklahoma Portland Cement Co., Denver, Colo., of selling cement directly to highway contractors. The elimination of dealers' commissions will mean a saving of about 16 cents on a barrel, according to Mr. Mandigo, engineer for the state highway commission. This direct selling policy does not apply to city paving, however.

This policy does not affect other cement companies selling in Oklahoma, Chauncey Nichols, manager of the Oklahoma company, said, but it is expected that they will likewise decide to sell directly to highway contractors. The price for cement used in Oklahoma road work will be \$2.76 per barrel, with deductions for the return of sacks and the discount.

EXPORTS AND IMPORTS OF HYDRAULIC CEMENT, BY MONTHS, IN 1926 AND 1927

Month	Exports		Imports	
	1926	1927	1926	1927
January	Barrels 72,939	Value \$216,431	Barrels 360,580	Value \$576,717
February	73,975	220,706	314,118	527,948
March	69,080	205,647	493,241	812,968
April	96,296	284,772	257,302	398,114
May	78,601	224,365	223,130	337,031
June	80,684	248,814	335,570	495,744
July	130,822	370,220	250,862	395,981
August	64,946	216,489	350,638	560,532
September	70,920	239,174	194,129	308,224
October	69,389	225,874	263,403	386,335
November	76,598	238,103	55,233	82,949
December	89,976	305,238	151,850	246,293
	974,226	2,995,833	3,250,056	5,128,836

Decotah Cement Sales Are Increased

SALES of Decotah portland cement manufactured at the South Dakota state cement plant at Rapid City, S. D., are better this year than they were in 1926, it was reported at a meeting of the state cement commission recently. The extent of the increase was not given, but it was said to be entirely satisfactory to the commission.

The commission stated that the date of the annual shutdown of the plant would depend principally on weather conditions, but would probably be some time in December.—*Sioux Falls (S. D.) Argus Leader.*

American Portland Plans Three Products Plants

MEASURES looking toward the construction of three cement products manufacturing plants in Los Angeles, Calif., were taken recently when the American Portland Cement Co. obtained options to a trio of sites in the industrial district, according to an announcement made by Briant S. Young, president of the company.

The lands covered by the options included a tract of eight acres on Alameda street, on a proposed lease of 49 years, at a stated rental of \$515,000; a 10-acre area on Alameda street, on a proposal to purchase at a stated figure of \$227,000, and a 9½-acre site on Slauson avenue, involving a proposed total rental of \$528,000 on a 49-year lease.

The locations are being considered by the company as the sites for plants to manufacture building blocks under a special process, to which the concern holds territorial patent rights. The source of cement for the plants will be from the proposed \$750,000 cement mill of the company in San Bernardino county, construction work on which is being rushed.—*Los Angeles (Calif.) Herald.*

J. S. Scobell

J. S. SCOBELL, general manager and J. treasurer of the Erie Sand and Gravel Co., Erie, Penn. died on December 11 at his home in Erie following an illness of two months. Mr. Scobell was one of the organizers of the sand and gravel company 25 years ago, and was active in the company since that time. He was born in Kingston, Canada, 77 years ago, but spent most of his life in Erie.

Charles Upham Heads New Highway Engineering Bureau

A RECENT announcement from Washington outlines the organization of the new Highway Engineering Bureau. This organization is composed of 11 of the most widely known engineers in the country on highway problems, and has been formed to function as a consulting and advisory organization for all phases of highway, transportation and associated industries. Charles M. Upham, managing director of the American Road Builders Association, has been elected president of the new organization and Fred E. Schnepfe has been made vice-president. The advisory engineers of the bureau are Albert T. Goldbeck, director of the bureau of research of the National Crushed Stone Association; Prevost Hubbard, Maurice Holland, Fred A. Reimer, Henry G. Shirley, Earl Stafford, Wm. A. Van Duzer, Dr. J. A. Waddell and Shortridge Hardesty. The bureau is prepared to render service on highway design, finance, estimates and organization as well on city planning, grade separation and other phases of public thoroughfare design. The bureau has arranged for facilities in foreign countries.

Program for Sand and Gravel Convention Announced

ACCORDING to the program for the 12th annual convention of the National Sand and Gravel Association which has recently been announced, there is going to be plenty to interest every producer who can possibly be in Detroit at that time. The papers to be presented cover every form of production and a glance at the program shows the caliber of the men who are to speak. The program of the three-day convention, which is to be held at the Book-Cadillac hotel, is announced as follows:

WEDNESDAY, JANUARY 4—10:30 A. M.
Morning Session

- 10:30 President's Opening Address.
- 11:00 Address of Welcome.
- 12:00 Luncheon of Producers' and Manufacturers' Division.
- Open Forum on Operating Problems in the Sand and Gravel Industry. J. L. Shiely, Chairman.
- Meeting of the Board of Directors immediately after the luncheon for the purpose of:
- Preparation of plan of activities for the association during the ensuing year, and also a budget to cover such activities for submission to the convention as a whole for approval.
- Nomination of candidates for the offices of president, vice-president and secretary-treasurer and also for three directors-at-large. Selection from their own number of four members of the Executive Committee for the year 1928.

Afternoon Session

- 2:30 Opening of Machinery Exhibit by the Manufacturers' Division, H. M. Davison, Chairman.

THURSDAY, JANUARY 5—10:30 A. M.
Morning Session

- 10:30 Report of Officers—President, Hugh Haddow, Jr. Secretary-Treasurer, Earl Zimmerman. Executive Secretary, V. P. Ahearn. Director, Engineering and Research Division, Stanton Walker.
- 1:30 "Transportation Problems in Connection With the Sand and Gravel Industry"—

M. J. Gormley, Chairman, Car Service Division, American Railway Association.

12:00 Adjournment.

Afternoon Session

- 2:30 "Construction Outlook for 1928"—T. S. Holden, Vice-President, F. W. Dodge Co., New York City.

3:00 Symposium on Marine Operations—

"Compensation Insurance in Marine Sand and Gravel Operations"—J. L. Richmond, Union Sand and Gravel Co., Huntington, W. Va.

"Design and Construction of Marine Sand and Gravel Units"—R. N. Coolidge, Dravo Construction Co., Pittsburgh, Penn.

Discussion of Papers on Marine Operations led by:

J. H. Duffy, Ohio River Sand Co., Louisville, Ky.

A. E. Frosch, East Liverpool Sand Co., East Liverpool, Ohio.

F. E. Hall, T. J. Hall and Co., Cincinnati, Ohio.

John Prince, Stewart Sand Co., Kansas City, Mo.

Capt. C. A. Smith, J. K. Davison and Bro., Pittsburgh, Penn.

FRIDAY, JANUARY 6—10:30 A. M.

Morning Session

- 10:30 Reports of Committees—Committee on Washed Gravel Ballast, Earl Zimmerman, Chairman.

Committee on Specifications for Standardized Sizes of Sand and Gravel, Stephen Stepanian, Chairman.

Committee on Standard Depreciation Scale, George A. Rogers, Chairman.

Committee on Engineering Problems, F. D. Coppock, Chairman.

Board of Directors.

- 11:00 "Recent Developments in the Manufacture and Use of Concrete Masonry"—W. D. M. Allan, Portland Cement Association, Chicago, Ill.

- 11:30 "Profitless Prosperity"—St. Elmo Lewis, Detroit, Mich.

12:00 Adjournment.

Afternoon Session

- 2:30 "Cleaning and Repairing of Cars Placed for Loading of Sand and Gravel at Plants"—J. C. Buckbee, President, Northern Gravel Co., Chicago, Ill.

- 3:00 "Inspection and Tests of Road Building Materials"—W. J. Emmons, Michigan State Highway Department.

3:30 Unfinished Business.

4:00 Adjournment.

Canada Cement Company Plans Improvements at Winnipeg Mill

A MILLION dollar expenditure at the Winnipeg plant of the Canada Cement Co. as the result of the proposed Flin Flon development in northern Canada has been announced. The company will supply the cement for the Flin Flon work, which includes construction of the smelter at the Flin Flon mine and the dams for the water power plant. The work of constructing the additions to the cement plant and the installation of machinery and equipment necessary for the increased production will begin at once.—*Boston (Mass.) Transcript.*

Peerless Portland and New Egyptian Portland Merge

ON December 16 the stockholders of the Peerless Portland Cement Co., Detroit, Mich., and the New Egyptian Portland Cement Co. of Port Huron, Mich., approved plans for a merger of the two companies. The consolidation will go into effect on January 3, 1928. The assets of the Peerless company total \$7,099,000, while the assets of the New Egyptian company are \$3,800,000. Both of the companies were built up

through the consolidation of groups of small plants in the Michigan area. About two years ago the Peerless company built a new mill in Detroit.

Green Bay Sand and Gravel Co. Sold

THE Green Bay Sand and Gravel Co. interests and properties at Maribel, Duck Creek and Peshtigo were recently purchased by Edward Schuster, contractor, for the consideration of \$39,000. The company owns three gravel pits, one located at each of the places mentioned above.

The new company will be incorporated under the name of Maribel Sand and Gravel Co., it was said, but for the present Mr. Schuster is the sole owner, he said. The purchase was negotiated during the latter part of last week.—*Marinette (Wis.) Eagle Star.*

Canadian Cement Specification Revised

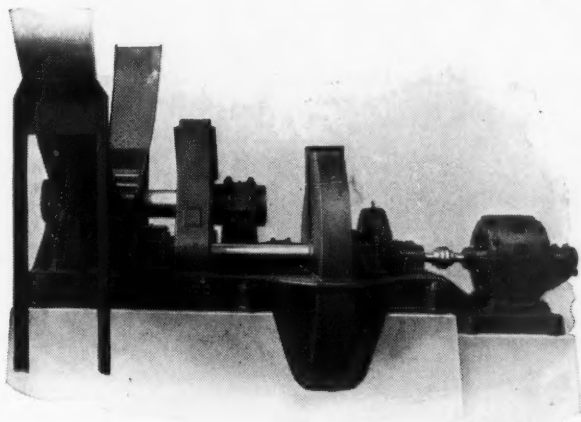
THE standard specifications for portland cement have been republished by the Canadian Engineering Standard Association. They are practically a reprint of specifications issued in 1922, the only revision being a change in the required minimum tensile strength for mortar briquettes. These requirements have been increased from 200 lb. to 225 lb. per sq. in. for the 7-day test and from 300 lb. to 325 lb. per sq. in. for the 28-day test. This edition is issued to meet the present demand, the former edition having been exhausted. It is probable, however, that in the near future somewhat radical revisions will be necessary, as there is a strong feeling among cement experts that the tensile tests should be abandoned in favor of compressive tests, and much experimental work is now being done in this connection.

National Silo Conference Attended by Cement Products Men

MANUFACTURERS of cement staves for silos recently met with the manufacturers of other types of farm silos at the National Silo Association convention held at the Hotel Sherman in Chicago on November 28 and 29. The Portland Cement Association was host to the convention, and on November 29 presented motion pictures of silo construction to the conference at the association offices. A. L. Haecher, of Lincoln, Nebr., spoke on the publicity work necessary to keep the silo business active. There was considerable discussion of cement stave silos during the two-day meeting, both in regard to construction and to selling.

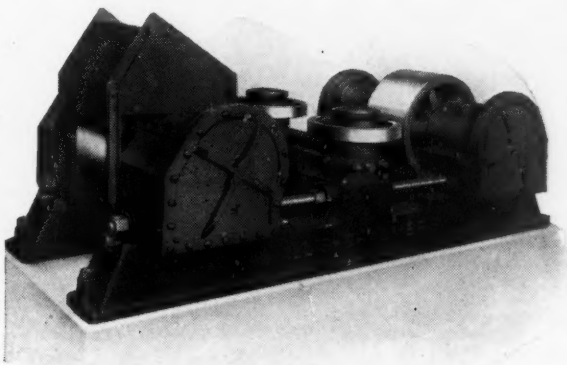
Development Based on Experience

YEARs of experience has placed Allis-Chalmers in the forefront of present day engineering practice and machinery design. Recent developments and improvements have been consistent with this age long policy. In the design of driving and carrying mechanism for kilns, dryers and coolers, the subject of simplicity and elimination of friction has received the most careful consideration all of which is expressed in the operating economy of Allis-Chalmers products.



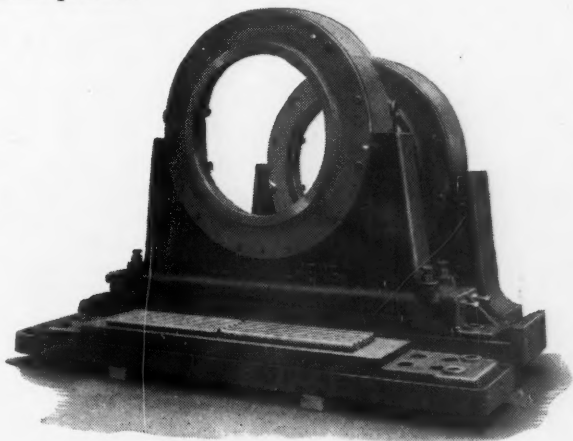
Direct Connected Driving Mechanism for rotary kilns, coolers and dryers

The cut to the right shows a recent development in large anti-friction bearings used in connection with compeb mills with bearing bases having rollers to take the longitudinal expansion of the mill.



New Tension Rod Type Self Oiling Carrying Mechanism for rotary kilns, coolers and dryers

Developments of great importance have been made to our kiln and cooler equipment. The driving mechanisms are so designed as to give the proper reduction for direct connection to the motor. All of the gears are totally enclosed, the high speed gears having a cast iron housing which is oil tight and dust proof.



Large Anti-Friction Bearing with Roller Expansion Base

The carrying mechanisms are equipped with a new type of oil wheels which insure automatic and continuous lubrication of the bearings, the oil being circulated out of the large reservoir in the base of the bearing. Bearings are also arranged for water cooling if desired. Tension rod type construction is used for these carrying mechanisms.

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News of All the Industry

Incorporations

Clayton Sand Corp., Clayton, N. Y., \$75,000.
 Liberty Sand and Gravel Co., Manhattan, N. Y., filed papers of final dissolution.
 Eaton Canyon Rock and Sand Co., Dover, Del., 20,000 shares, no par value.
 Owens & Jones Slate Co., Granville, N. Y. Filed papers of final dissolution.
 Union Lime Co., Portland, Ore., \$50,000. B. P. Turpin, Helen Turpin, John Turpin and others.
 Cobleskill Limestone Products Corp., Cobleskill, N. Y., \$800,000. A. T. Warner, 7 Dey St., Manhattan, N. Y.
 Tamp-A-Lithic Concrete Unit Co., Tampa, Fla., \$10,000. Bailly B. Baxter, C. M. Washburn and J. G. Scott.
 Standard Concrete Tile Corp., Los Angeles, Calif., \$500,000. James S. Hull, C. J. Hull and John W. Cameron.
 Georgia Lime Rock Co., Perry, Ga., \$150,000. To quarry and sell lime rock. W. M. Palmer and J. H. Williams.
 Bind Lime and Cement Co., San Antonio, Tex., \$10,000. J. S. McManus, Wm. A. Tarrillion and M. M. Bird.
 Cast Stone Cement Block and Tile Co., Toledo, Ohio, 1000 shares, no par value. Elon Gauntlett, U. G. Denman and Stuart Wall.
 Penn-Jersey Sand Co., Haddonfield, N. J., \$25,000. A. E. Platt, C. B. Somers, Evelyn K. Platt and Grace M. Somers.
 Meyers & Co., Portland, Ore., manufacturers of cement products, has changed its name to Central Mixed Concrete Co. and has reduced its capital to \$1,000.
 Nast Lime and Stone Co., Eden, Wis., 500 shares of \$100 each. To produce and sell stone, lime, sand and gravel. Edwin A. Nast, Katherine M. Nast and A. J. Lusty.
 Twin States Sand and Gravel Co., Trenton, N. J., \$250,000 preferred stock, 5,000 shares common stock, no par value. E. M. Fisher, D. G. Eisenbach and Louis Gerber, all of Trenton.
 Friend Sand and Gravel Co., Petersburg, Va., \$15,000 to \$25,000. President, George W. Shuster, Philadelphia; secretary, W. I. Cox, Petersburg, and Thomas Whyte and J. Gordon Bohannon, both of Petersburg.
 Humphreys Phosphate Co., Denver, Colo., \$250,000. To take over phosphate lands in Utah. President, I. B. Humphreys; vice-presidents, A. E. Humphreys, C. F. Clay and J. H. Ratliff; treasurer, Frank Cox; secretary, J. S. Hubbard. No immediate development is contemplated.

Quarries

Rockwood Alabama Stone Co., Russellville, Ala., has awarded the contract for 600 tons of structural steel for its new plant to the Ingalls Iron Co., Birmingham, Ala.
 Waltham, Mass. The unused municipal stone crushing plant was almost completely destroyed by fire on Dec. 3. It is now expected that the remaining portion will be wrecked and the site used as a city park.
 Moline, Ill. Property owners obtained a hearing before the city council, claiming that blasting in the Moline quarry of the Bettendorf Stone Co., Davenport, Iowa, has done considerable damage in the vicinity. R. E. Corey, in charge of operation at the quarry, denied the charges.
 Pink Granite Co., Milford, Mass., will sell the equipment of the old Bay State quarry at Milford, but will retain the quarry for a time, at least. The derricks are being shipped to the George A. Fuller Co. to be used at the Rockwood Alabama Stone Co., Russellville, Ala., which was recently acquired by the Fuller company.

Sand and Gravel

Ball-Newark Gravel Co., Little Rock, Ark., has changed its name to Newark Gravel Co.
 Rainbow Gravel Co., Solon Mills, Ill., has let the contract for a new gravel washing plant.

Columbia Sand and Gravel Co., Washington, D. C., is building a 5000-ton storage bin.
 Nickum & Kelly Sand and Gravel Co., Portland, Ore., sustained a loss of about \$3,000 by fire recently.

Belvedere Gravel Co., Compton, Calif., has started in business at 120 N. Tamarind St. under the management of D. H. Burden.

McGrath Sand and Gravel Co., Forrester, Ill., is rushing the completion of new buildings and repairs to equipment in preparation for spring.

Indiana Gravel Co., Fort Wayne, Ind., has purchased 90 acres of gravel land at Ionia, Mich., and will develop the tract on a large scale.

San Marcos, Tex. A. L. Alderson, New Orleans, La., is reported to have leased property on the Blanco river on which he will establish a sand and gravel plant.

Dallas, Tex. Gravel deposits have been found on land owned by the city of Dallas at White Rock, and it is proposed to develop a pit for supplying gravel for work on the streets.

Zanesville Washed Gravel Co., Dresden, Ohio, plans to rebuild the portion of its plant which was destroyed by fire on Nov. 14. The loss from the fire was estimated to be more than \$85,000.

Greenville Gravel Corp., Greenville, Ohio, has placed an order with the Ohio Agricultural Experiment Station for 34,000 trees to be used in the development of a park in its old gravel pit at Ft. Jefferson.

E. T. Sliden Co., Louisville, Ky., has completed the remodeling of its big suction dredge. The old steam plant on the dredge has been replaced with a six-cylinder, crude-oil motor for the pumps and a similar four-cylinder motor for the auxiliaries. The company's small dredge continued operations during the remodeling of the large digger.

Sand Point Gravel Co., Seattle, Wash., has become the center of a controversy concerning the Sand Point Naval Air Field. It is claimed that the field will have to be abandoned unless the gravel company does away with their sand ship, which is docked at a point adjacent to the field and which, because of its high superstructure, is a hazard to planes taking off from and alighting at the field.

J. E. Irvine, Green River, Wyo., who operates one of the largest gravel pits in Wyoming on the Green river near the town of Green River, will transfer his operations to a site just south of the town during the winter months and will begin production from the new pit next April. Approximately \$50,000 will be spent in opening and equipping the new pit. The plant will have capacity to handle from 600 to 800 tons daily.

Camden Gravel Co., Camden, S. C., a recently formed corporation, will build a washing and screening plant on the Wateree river near Camden. Sand for the new plant will be obtained from the river, and H. Penuel and J. P. Wilson, of Orlando, Fla., have taken the contract to pump the sand to the Camden company's plant from the river. L. O. Funderburk, W. C. Seagle and J. A. Loughlin, all of Camden, are the organizers of the gravel company.

George R. Humlong & Sons, Bronte, Tex., have purchased new machinery costing \$20,000 for their gravel pit and plant for removing gravel from the Colorado river, and it is expected that production will be increased to 780 carloads per month. The company has a contract with the Kansas City, Mexico and Orient railroad for furnishing 10,000 to 20,000 carloads annually for ballast, but according to the contract the railroad excavates the gravel and pays the gravel company a royalty.

Cement

Colorado Portland Cement Co., Denver, Colo., has not yet completed its plant at Fort Collins, Colo., but the mill is already turning out more than 1000 bbl. daily.

Pacific Coast Cement Co., Seattle, Wash., is negotiating for the purchase of the full-rigged sailing ship "St. Paul" to be used in connection with the operation of the company's quarries at Dall Island, Alaska.

San Antonio Portland Cement Co., San Antonio, Tex., has awarded the contract for the structural steel for framing and bins of its new finishing mill at the Cementville plant, to the Houston Structural Steel Co. of Houston, Tex.

South Dakota State Cement Plant, Rapid City, S. D., is contemplating the purchase of 80 acres of additional land for quarry purposes, since the limestone on the property now owned is covered with an excessive overburden.

Northwestern Portland Cement Co., Portland, Ore., has announced that the new mill which it is constructing at Grotto, Wash., will be ready for operation early in January. Recently a \$75,000 contract for electrical equipment was let to the General Electric Co.

Cement Products

Bent Concrete Pipe Co., South Gate, Calif., has commenced the construction of a new factory to cost about \$5,000.

Everett Concrete Products Co., Everett, Wash., has brought out a new product for the holiday season—a concrete base for Christmas trees.

Aywon Cement Products Co., Brooklyn, N. Y., will occupy a portion of the new manufacturing district development around Jamaica Bay. Property in the district has already been acquired.

Bemidji Concrete Mfg. Co., Bemidji, Minn., is to be sold by order of the company's stockholders at a recent meeting. After the entire assets of the company are disposed of, the company will be dissolved.

Lime

Diamond Springs Lime Co., Diamond Springs, Calif., will start the construction of a new plant in January to cost about \$400,000. A tramway three miles long will be built.

Gypsum

Atlantic Gypsum Co., Boston, Mass., has filed plans for a new six-floor factory 60x62 ft. at Cabot St. and the East river, New York City. The building will cost \$45,000.

United States Gypsum Co., Chicago, Ill., has established a warehouse and office in Oakland, Calif., at 1705 Poplar St. The company formerly maintained Oakland offices at the Builders Exchange Bldg.

Miscellaneous Rock Products

Marfa, Tex. A. A. Snell and associates have obtained about 5000 acres of sodium and potash nitrate lands and will develop the property. Most of the machinery for a 500-ton plant has already been purchased.

Patterson, Calif. J. G. Berryhill, of San Francisco, Calif., has leased the extensive magnesite deposits on the property of the Patterson Ranch Co., at Patterson, Calif., and has purchased several adjoining deposits of magnesite. The plant on the Patterson property will be rehabilitated at once.

Bowditch, N. C. J. F. Shinn, Norwood, N. C., and James L. Hyatt, Burnsville, N. C., are organizing a company to construct and operate a feldspar mine and grinding plant at Bowditch. Plans are being drawn for a mill with an initial capacity of 150 tons per day, to cost about \$400,000, and it is reported that 3000 acres of land have been secured. Rudolph Glaty, formerly connected with North State Feldspar Corp., Micaville, N. C., will be general superintendent and technical expert.

Northwest Mineral Products Co., Tacoma, Wash., is planning the construction of a plant to cost about \$4,000, for the preparation of silica quartz, talc, fuller's earth and chemical lime for various industries. The deposits of raw material are located at Merritt, Wash., near Ellensburg, Wash., and in Skagit county. A. C. Merrill is president and general manager; Lauritz Larson, secretary-treasurer, and Charles Westcott, director of the new company, which is incorporated for \$99,999.

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Personals

Harlowe Hardinge, vice-president and general manager of the Hardinge Co., York, Penn., is making a six weeks' business trip to France and England.

E. M. Confer, formerly of the Phoenix Portland Cement Corp., Birmingham, Ala., has been appointed superintendent of the Varnons, Ala., plant of the Alabama Lime and Stone Corp., Birmingham, Ala.

Charles A. McKeand, assistant to the president of the Rockland and Rockport Lime Corp., Rockland, Me., has resigned his connection with the Florida company and will be associated with a number of other Tampa projects.

William C. Bird has resigned as vice-president of the Rockland and Rockport Lime Corp., Rockland, Me., and has joined the staff of Bond & Goodwin, Inc., New York brokers. Mr. Bird joined the lime company in 1920 as general superintendent.

Van Cortright Mekel, formerly connected with Taylor-Wharton Iron and Steel Co. of High Bridge, N. J., in capacities of special research investigator, mechanical engineer and sales engineer, has resigned to accept a post as special representative of the Nugent Steel Castings Co., Chicago, Ill.

Obituaries

Robert Davis, superintendent of the Wabash Sand and Gravel Co. plant at Montezuma, Ind., was drowned recently when his auto collided with another car and ran off the road into the Wabash river. Mr. Davis was 41 years old.

Manufacturers

Lincoln Electric Co., Cleveland, Ohio, announces the transfer of E. F. Hoff from the welder division at Cleveland to the welder division at New York, where he will be in charge of welder service under the direction of G. N. Ball, district manager.

R. H. Beaumont Co., Philadelphia, Penn., will exhibit working models of their cable dragline scraper system, and their slackline excavator system at the National Road Show in Cleveland in January. The models will be set up and hauling sand in a 6x10-ft. "field."

Rollway Bearing Co., Inc., Syracuse, N. Y., have opened a sales office in the Empire Bldg., Pittsburgh, Penn. Samuel Farrell, who has been associated with the Youngstown, Ohio, office of the company for a number of years, will have charge of the Pittsburgh office.

Mundy Sales Corp., New York, N. Y., announces the appointment of the Smith Booth Usher Co. as exclusive distributors in California, Nevada and Arizona of the Mundy line of hoisting engines and the derrick equipment manufactured by the Dobbie Foundry and Machine Co., Niagara Falls, N. Y. The Smith Booth Usher Co. will maintain offices in both San Francisco and Los Angeles.

Combustion Engineering Corp., New York, announces a number of changes in the design of its air preheaters. The changes include access doors which permit blowing the entire surface of the gas passages with steam or air lances, welded assembly construction in order to eliminate any leakage from the air side to the gas side, and new arrangement of the gas and air openings in what is known as the "S" flow design.

Trade Literature

NOTICE—Any publication mentioned under this heading will be sent free unless otherwise noted, to readers, on request to the firm issuing the publication. When writing for any of the items kindly mention *Rock Products*.

G. E. Bulletin. GEA-528A, small, multi-stage centrifugal air compressors.

Oil Engines. Illustrated bulletin on typical installations. BUCKEYE MACHINE CO., Lima, Ohio.

Snow Loaders. Catalog 1027, describing and illustrating use and operation of snow loaders. GEORGE HAISS MFG. CO., INC., New York.

Fathers of Industry. Booklet giving a historical sketch of the work of the founders of the company. HAZARD MANUFACTURING CO., Wilkes-Barre, Penn.

Centrifugal Pumps. Illustrated book on the types, designs and uses of centrifugal pumps. Book is

divided into chapters and includes one chapter on characteristic curves with formulas. DE LAVAL STEAM TURBINE CO., Trenton, N. J.

Friction Clutches and Transmission Machinery. Catalog No. 68 of Plamondon Mfg. Co. line of friction clutches and transmission equipment. FOOTE BROS. GEAR AND MACHINE CO., Chicago.

Worm Gears. Illustrated worm gear catalog No. 35, including tabulations of horsepower capacities for speed reducers and illustrations of typical installations. W. A. JONES MACHINE CO., Chicago.

Motors for Refrigerator Compressors. Bulletin on synchronous motors for refrigerator compressors, with illustrations of typical installations. ELECTRIC MACHINERY MANUFACTURING CO., Minneapolis, Minn.

Centrifugal Pumps. Illustrated bulletin No. 209 on double-suction, single-stage centrifugal pumps, containing pictures of typical installations and tables of useful data. PENNSYLVANIA PUMP AND COMPRESSOR CO., Easton, Penn.

Oil Burners and Preheaters. Illustrated bulletin on uses of oil burners and preheaters. Acetylene Generators. Illustrated bulletin on generators for oxy-acetylene outfits. ALEXANDER MILBURN CO., Baltimore, Md.

Some Fundamentals of Water-Cooled Furnace Design. Illustrated bulletin by Prof. W. J. Wohlenberg on the outstanding types of water-cooled furnaces, with charts and other data. Erie City Vortex Furnace. Illustrated bulletin on firing small tube boilers with pulverized coal. ERIE CITY IRON WORKS, Erie, Penn.

New York Sand and Gravel Men to Meet

THE Empire State (N. Y.) Sand and Gravel Producers Association is now laying plans for the annual meeting which will come about the middle of January, according to John G. Carpenter, the secretary. The meeting will probably be held at Rochester, where the offices of the association are located. It is certain that a number of matters of interest to eastern sand and gravel producers will be brought up at the convention, including the discussion on the report of the committee working for the establishment of a system of uniform inspection of aggregates. The committee has taken this up with the state highway department and the New York State Crushed Stone Association and some work has already been accomplished on it. The speakers for the meeting have not yet been announced, but it is certain that there will be someone of national prominence on the program.

New York Crushed Stone Producers Hold Annual Meeting

ON December 16, the New York State Crushed Stone Association met at Rochester, N. Y., for its annual meeting. The principal business of the day was the discussion of the National Crushed Stone Association convention to be held at West Baden, Ind. Mr. Graves outlined the program for the national convention and urged every New York producer to attend. A resolution was passed that the members of the association who were going to the convention would gather in Buffalo and leave in a body from there on special Pullmans for West Baden. The matter of aiding the national association in the establishment of a research laboratory was discussed, and upon the motion of Harold Owens it was resolved that the secretary should commu-

nicate with all members urging them to give their support, financial and otherwise, to this project.

George E. Schaefer of the General Crushed Stone Co., Rochester, who presided at the meeting, was re-elected president, and Jeremiah Cushing was named vice-president. Frank Owens, Rock Cut Stone Co., was elected secretary and treasurer. There were 24 members present.

W. F. Jahncke Made President of National Builders Supply Association

THE 27th annual convention of the National Builders Supply Association met in Cleveland, Ohio, on December 6 and 7. At this meeting Walter F. Jahncke of New Orleans was named president; Graham Murtha, New York, vice-president, and C. P. Thompson, Chicago, secretary. Mr. Jahncke is no stranger to readers of *Rock Products*, since he is a director of the National Sand and Gravel Association, as well as being



Walter F. Jahncke

vice-president and general manager of the Jahncke Service, of New Orleans.

In his address to the convention, Mr. Jahncke urged the need of co-operation within the association and outside as well, suggesting the slogan "Co-operation and results." Speaking of the attitude of government toward private enterprise, he stated, "I firmly believe that the day is fast approaching when the governments—federal and state—will practice less of supervision and more of co-operation." And talking of the contacts between producer and distributor, he said: "There should be the most cordial relationship of building supply dealer and manufacturer."

